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THE GREAT EXHIBITION.

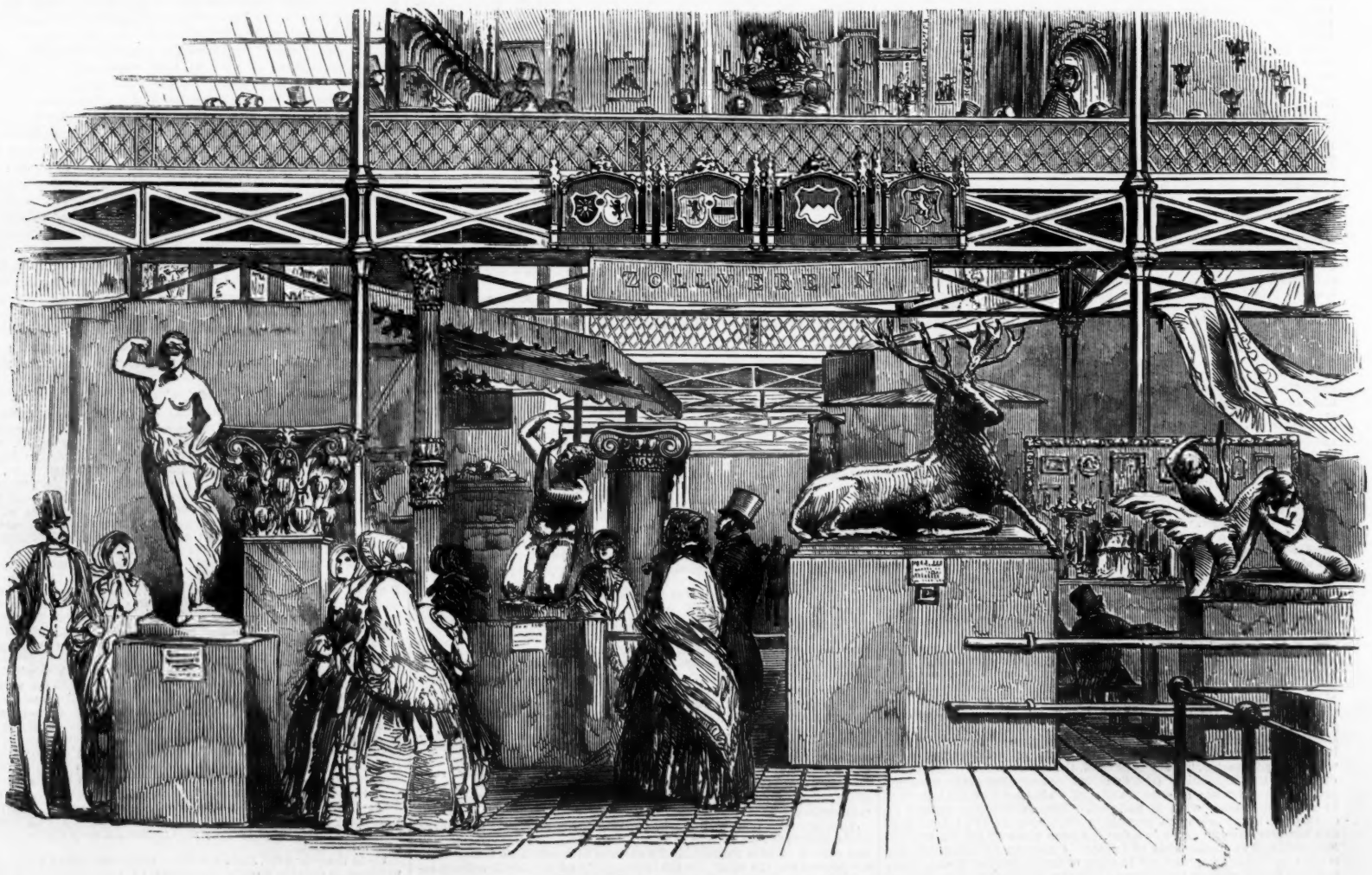
THE ZOLLVEREIN.

OUR readers are probably aware that the Zollverein (toll-union), which occupies a large part of the Crystal Palace, is not the name of any country known either to ancient or modern geography. It designates a union of several States of Germany under one common custom-house law,—a policy, not a country,—which brings under one series of fiscal regulations, concerning import and export duties, the subjects of several States of Germany having somewhat different laws and lying widely apart. It embraces Prussia, Saxony, Wirtemburg, Bavaria, Baden, Nassau, the two Hesses, and all the minor States of the centre of Germany, and contains altogether somewhere about 26,000,000 people. Hanover, Brunswick, Oldenburgh, Bremen, Lubeck, Mecklenburgh, on the north; Bohemia, Austria Proper and other German dominions of Austria, on the south, are not members of this Union. Prior to its being formed, the 37 States, large and small, into which Germany was divided, levied each its own duties and tolls on rivers and roads, and had its own custom-house officers to levy them. As the rule, no goods could be transmitted through any one of these States to another, or sent from one to another, without being subject to all the vexatious delay of a custom-house examination at the boundaries of every State. The actual facts were still worse, for many noblemen and cities levied, till a very recent period, private tolls; and at their "bars" all goods were liable to a similar examination. The annoyance of this system, to say nothing of the accompanying annoyance of passports, which still continues, was immense, and far exceeded anything of which our people, long united under one Government, and having amongst themselves internally a perfectly free communication, have ever practically had to form any conception of. To get rid of some of these vexations, the States above mentioned, under the influence of Prussia, united themselves about twenty years ago into one body abolishing all intermediate tolls and custom duties, and levying only duties common to all, at the one extreme boundary of the united States, and dividing the revenue accruing among the different States composing the union, in proportion to their size, population, consumption, and previous revenue, &c. The States not in the Union, and the other German States, preserve their own revenue laws; and, so far as trade and customs duties are concerned, may be considered as foreigners. The readers will see, therefore, that the name Zollverein in the Exhibition is a mere political designation for a great part of Germany, separating it from Northern Germany on the one hand, and from the Austrian dominions on the other; and such products of the industry of the 26,000,000 people comprised in the Union as they are pleased to exhibit, it is now our intention to describe.

The department of the Zollverein is in the eastern part of the Crystal Palace, approximating towards the centre. It extends on both sides of the Nave into the galleries, as well as on the ground-floor; has Russia on the east and Austria on the west. Intermingled with it, however, is the space appropriated to Northern Germany, an arrangement justified by the geographical relations of the two, but at variance with the political designations, and the source of some confusion. In truth, disorder in arrangement, singularly enough for the methodical Germans, seems to us to characterise their part of the Exhibition. Although Wirtemburg, Saxony, and Bavaria have distinct exhibition rooms on the south side of the Nave, in which to display their cloths and shawls and stockings; in the Grand Centre Hall of the Zollverein on the north some of their most distinguished products, and the most distinguished products of the other states, are mingled with the products of Prussia, which disables us from forming a just appreciation of the industry of the separate people, or of the whole Zollverein. In the medley, we cannot compare and contrast what has been done by the lively, vain, egotistical and royal Prussian with the productions of the more solid and somewhat duller electoral or grand ducal Hessian; nor can we conveniently distinguish between the industry which is rooted on the Iser and that which flourishes on the Elbe or the Rhine. The arrangement which deprives the several people of their customary distinctions, to unite the exhibition of their industry under one political name, does not seem to us to be a happy one. If it could give them a political unity, and make them one state, as they are one people in language and literature, getting rid of the expense of many sovereigns, many courts, and many separate functionaries, we might hail it with satisfaction; but in the Exhibition it only loses them in Prussia, and drowns all their peculiarities in one muddy political stream.

The general remarks which follow apply in a great measure to the industry of all the Germans, not excluding even the Austrians, though we have described separately the Austrian part of the Exhibition; and we must, therefore, make our readers fully aware of the number of people to whom they apply. The Zollverein contains about 26,000,000; Northern Germany, about 4,000,000; and Austrian Germany, about 7,000,000. The country they inhabit extends from the Baltic to the Iser and the Rhine, from the German Ocean to the Carpathian Alps, and embraces a great variety of soil-surface and climate. It is rich in minerals and raw products, and is traversed by numerous large rivers. It is the best and principal part of central Europe. For such a country and such a people, the exhibition of their industry strikes us as comparatively poor and comparatively uniform. There is a sameness in it throughout, not met with in any other part of the Exhibition of equal pretensions.

In one great natural quality Germany is deficient, and the want of it has been much aggravated, instead of being relieved, by the policy of its governments. It has comparatively a small extent of sea-coast. Denmark and Holland shut it out from a direct connexion and communication with two parts of the ocean. It has had, therefore, in



THE ZOLLVEREIN COURT.—FROM A DAGUERREOTYPE BY BEARD.

elation to other states, a small and not fast-growing foreign trade. The many small states into which it was divided, and the absurd fiscal regulations in each, aiding the want of ocean communication, till very modern times limited and hampered its internal traffic. The consequence was, that the subjects of each state were pretty much confined to their own products for subsistence; and comparatively little separation of employments, or little division of labour ensued, and, as a consequence, little variety in the industry of the people. The Germans rather pride themselves on the circumstance, that division of labour is not extensive amongst them—that they are what they call many-sided; but that is only an approach to barbarism, when every individual provided by his own means for all his own wants. To satisfy the common demands for food and clothing they all necessarily adopted the same or similar arts; and the same causes continuing to prevent the separation of employments, they have continued the same or similar practices. In conjunction with this, too, the restrictive governments undertook to a degree unknown in England to guide the industry of their subjects; and as they were generally actuated by a similar policy, and had similar objects to attain, they generally directed the industry of the people in similar paths.

After the wants of food and clothing were supplied, the great object of the different governments, besides the common desire of military power, was to have luxuries provided for courts, which for a long period borrowed their ideas of luxury from the French court as a common model. Accordingly, as you pass amidst apartments hung full of cloth and of damasked linen, with a profusion of swords and cutlery, walking-sticks, pipes, buttons, and common tools, models of old castles or modern residences, remarkable only as the birth-place of a Prince (in the English collection are models of our sea-ports and chain and tubular bridges), with some fine porcelain, some exquisitely carved ivory, some delicate bronzes, and some admirably stained glass, you find a great uniformity in the products, of numerous distinct and different people, for which you were hardly prepared; nor is the impression changed by some well prepared leather for different purposes, some valuable mineral and other raw products, several specimens of wool, and some splendid crystals and colours; the result of chemical arts, and a little well-wrought furniture. What is called Berlin-wool, raised carpeting scarcely fit to walk on, models of castles, dried fruits, a multitude of ornaments in cast iron, an abundance of toys, playing cards, much jewellery, piles of stockings and suspenders, with a few printed books, scarcely redeem the whole from an appearance of frivolity as well as uniformity.

Many of the articles would excite surprise in any exhibition, but we are astonished to find them so many leagues away from the place where they were made. The Germans supposed they were to sell, as well as exhibit; they looked on the Exhibition as a market, and thought that the cheapness of their hose, their cutlery, their common tools, and their cloth would ensure them numerous customers. In fact, many of their articles are avowedly exhibited only on account of their cheapness, not on account of their excellence, their rarity, or their beauty; and they have prepared and published a catalogue in which the prices are marked, for the very purpose of showing that they can undersell the English, particularly in hose, cutlery and cloths. Till the quality of the articles can be brought to a test, this appears to be possible. They imitate our patterns, and try to sell their goods as English. We noticed, and to our surprise, in the Saxon department, and amongst the hose, one or two pair marked very distinctly, in good English letters, "Merino patent," such as used to be stamped on a favourite English production. We have some doubts of the propriety of allowing such *contrefaçons* to appear in the Exhibition. It reminded us of what we saw on the Hartz a great many years ago, where the shot cast at a celebrated lead manufactory were all packed up in bags, with the names and labels imprinted on them of English makers. We were told by an American gentleman in the Exhibition, "It is quite true the Germans have improved very much in making cutlery within a few years. I have had a great deal to do with them in the matter. They were anxious to sell their goods in our markets; but they were so clumsy, our people would not look at them. I then sent patterns of your best London and Sheffield makers to Solingen, and the Germans made their cutlery after these patterns, putting on them the name of Rodgers and Son, or some other celebrated English maker. The German cutlery looked very well, and was sold cheap; but, on being tried, it was not half so good as that of the English, and I doubt whether the sale will increase." In various kinds of cutlery, that can scarcely be proved, the Germans make a great show; but it is evident even here, that the bulk of their articles are made after English patterns. They are intended, too, we believe, more for a foreign market, than for home consumption.

If the Exhibition were a mart, where the artisan could buy a pair of pincers, a dandy a cravat, a housewife a jar of preserves or of potted larks, and parents Christmas presents for their children, it could scarcely be richer in the supply of these and similar articles from Germany. With some exceptions, which it will be our business hereafter especially to notice, the products of German industry, taken as a whole, therefore, may be characterised as displaying little variety; and many parts of it are trivial, neither adding to national wealth nor helping forward national greatness, Admitting the fact, but implying that the Germans have a richer and more varied industry than they have shewn, which we doubt, a German writer in the *Allgemeine Zeitung* states "that Germany is here exhibited to foreigners as small change." Who, then, is culpable for having kept back the large coins and the more precious ingots, if they exist?

German industry is not only uniform, it is obviously imitative. There is as complete a want of independent thought in their art as in their political reforms. What they exhibit gives us a painful impression of an emaculated industry. We see few or no articles that can be called peculiar; and such as there are give no idea of vigour: cast-iron ornaments, children's toys, chemical crystals, are amongst the most striking peculiarities, and all of them are rather puerile than grand. The most popular part of their exhibition is a large collection of stuffed birds and beasts in a variety of positions and pursuits congenial to the animals. Around this, valueless as it is, a great crowd generally gathers, though not a few persons turn away from the bleeding animals, pulled down by dogs or worrying one another, offended and disgusted. Such an exhibition, like the toys, is better adapted to children and the vulgar, than to mature and enlightened beings. Little or nothing is to be learned from it, even of the habits of animals; and it is of too little use and too much the work of an individual, to be worthy of a place in an Exhibition of National Industry.

France has its *bijouterie*, its exquisite ornaments, its unmistakeable graceful luxuries, its adornments for boudoirs and persons; England has its solid and compact machinery, often as neat and elegant in form, though rigid, as it is useful; the United States have their rocking and their other chairs, their sewing machine, and their almost infinite application of caoutchouc; Russia has its furs, its hemp, its malachite; even Austria, with its Vienna furniture and its Bohemian glass, which are German, has something of its own. Nay, Tunis and India shine out conspicuous and peculiar. Only Germany, of all the nations of Europe, has nothing apparently in the Exhibition which can be said to be characteristic of it, but its toys, a few skull caps, and some useful specimens of domestic wool manufacture; borrowing its ornamental arts mainly from France, its useful arts from England, the things it exhibits are chiefly imitations, very often deficient in the grace, the lightness, the neatness, and convenience of the originals. Its productions are solid, substantial, sometimes cumbrous, and generally honestly made, but they are all in the main French or English, rather than peculiarly German. Perhaps those who have had the ordering of the matter have wished chiefly to exhibit the success of the Germans as rivalling other nations, and have rather brought forward European than German productions. They have exhibited no specimen of their durable but old-fashioned furniture; of their *frachtwagen* with their loads packed and secured to resist the jolting of bad roads, like the cargoes of ships, which move not when tossed about by the waves; no specimen of their multifarious vegetable productions on which the bulk of the people live, or of the useful and comfortable garments that their domestic industry still provides for the great multitude, all of which are at once peculiar and picturesque; they are sometimes, too, convenient. Germany has many peculiarities, but they belong to a past age, and the Royal Commissioners, who have presided over the German part of the Exhibition, have not been desirous to exhibit them. "I cannot deny," says the writer already quoted, "that, in general, the specimens of German industry in the Exhibition (the fine arts are not included) have no peculiar character, and give me the idea of its having been the intention to avoid exhibiting what is national. German industry appears in every department to lean on something foreign, or to be an imitation, and nowhere to stand on its own feet. At one place we see the hand of England, and at another that of France. I may be mistaken, but this is my very distinct impression." If we turn to the machinery exhibited, we shall find it of little importance; and the principal objects, such as the vacuum pan and the Jacquard loom very imperfectly improved as compared with others in the Building, are borrowed from England or France. The machinery exhibited, and generally too the tools and the cutlery, are imitations of those of England, and can have nothing to recommend them, if it be not their cheapness.

The nature of German industry in general is brought into a strong light by the varied industry of Hamburgh, and the taste displayed in the exhibition of the articles sent from that city. It has furnished no less than 123; while the rest of North Germany, the kingdom of Hanover, Lubeck, the two Mecklenburghs, have supplied only 35. They consist chiefly of useful and ornamental furniture, such as side-boards, sofa-tables, &c., of a very superior description; of clocks, musical instruments, specimens of oil-cake and refined sugar, charts, pianofortes, saws, rocking-chairs, looking-glasses, bird-cages, and a large assortment of walking-sticks. Here, however, instead of being merely hung against the wall, they are displayed in a cheerful tasteful manner, so that the Hamburgh room has a light and elegant appearance, superior to that of the central room of the Zollverein, in which are heaped together all the best and richest of its contributions. On entering the apartment, the spectator is much struck by a representation of the sun sending his rays on all sides placed against the opposite wall of the apartment. It is composed of walking-sticks, chiefly from the workshops of C. A. Meyer, who employs above three hundred persons, and exports walking-sticks to all parts of the world. In Hamburgh, as in London, it is a considerable trade; and, as a source of wealth, is not inaptly typified by the sun. Herr Meyer, the founder of the house, is a good specimen of what trade does for men in Germany as well as in England. He arrived in the city from Thuringia, with no other wealth than his skill in carving wood; and, by care, frugality, and an opportunity of exerting his talents, he has created a large establishment, and become one of the princely merchants of the city. He is an individual example of the general opulence and general industry and skill of Hamburgh. It was, and yet is, practically and truly free—not merely nominally a free city; and the success of its industry as displayed in the Exhibition in comparison with the industry of the many long-enthralled states of Germany, does honour to its freedom.

The products, too, of German industry exhibited in the department of the Zollverein are as ill displayed, if we except the entrance to its most eastern compartment on the north side and the hall in the centre, as it is uniform and trivial. No one mind seems to have presided over it to bring out its advantages, though the superintendance has been confided to a Royal Commissioner. There is a want of order and symmetry in the display of the articles, which, coming from different places, are confusing as a study. The arrangements have been compared, but rather harshly, to the booths of Leipsic fair. The articles are arranged without much regard to effect. The masses of cloth in one place hung up to the ceiling and hanging down to the floor, reminded us of St. Bartholemew's-lane; and the great cards of common cutlery tools stuck against the wall in another, of ironmonger's patterns, such as a traveller from Wolverhampton or Birmingham carries about with him when he goes to solicit orders.

Saxony, Bavaria, and Wirtemburg have, for part of their exhibition, rooms to themselves, and those of Saxony are neatly, though plainly fitted up. But they are denuded of their richest and best ornaments to place them in the centre room, where Prussia tries to absorb all the glory. This arrangement has a doubly ill effect: it heaps all the very elegant and most admired products in one room, where the abundance of them tends to dazzle and bewilder, and it deprives the other parts of the German exhibition of ornaments that would redeem them from the reproach of being "all grey."

Adding the imperfect arrangement of the single articles to the mingling together the products of different States, the Zollverein seems, on the whole, one of the least satisfactory, if it be not exactly one of the least elegant parts of the Exhibition.

As we have already adverted to the Sculpture, including that from Germany, we do not extend our present remarks to the latter. It stands on a different footing, and is treated of with reference to its value as a product of the mind. German sculpture takes a high, if not the first place in the Exhibition, but that art, though treated successfully by the Germans, we need scarcely remark, is not peculiarly German.

Passing from this first and general impression to notice particular objects, we enter from the east end of the Crystal Palace the first department of the Zollverein on the north side. Our attention is arrested at the entrance by an object which forcibly reminds us of the military character of the principal State of the Verein, and indeed of all the German States. Planted at the centre, as if to forbid entrance, or at least to allow it only on conditions, stands a remarkably well mounted field-piece. The gun gives you the idea of solid and substantial work. At the same time it is highly polished; and the plain varnished carriage is a perfect model, on a small scale, like one of Maudslay's engines, of compactness and neatness combined with great strength. The workmanship has the finish of a jewel, concealing in the instrument the power of a demon. Beneath it are polished cuirasses and other instruments or emblems of war, destruction, and death. This is the shape in which an invention of a new process for the manufacture of one of the most useful things shown in the whole department, cast steel, is exhibited. We admire Herr H. Krupp's skill, but should have thought better of him and better of Germany had it been displayed in rollers such as are employed with great success at Munich, for grinding corn, or surgical instruments, or something more appropriate to this peaceful age and to the Exhibition, than a model field-piece.

Close by it, however, inviting you to the confidence which the gun repels, hangs an altar-piece, in which are worked and emblazoned the words "*Gott ist die Liebe; und wer in der Liebe bleibt, der bleibt in Gott, und Gott in ihm*" ("God is love; and who dwells in love, dwells in God, and God in him"). There is not much in the article to admire, but the sentiment is very expressive of the affectionate kindly character of the Germans. The care they take to provide amusement and employment, as well as instruction for their children, as exemplified in one of their chief manufactures, and which a rugged hard people would have neither patience to begin nor the kindliness to continue, is another illustration of the same characteristics. The more one traces their kindliness in their manners, the more it is to be regretted that a contrary principle presides over their affairs, as typified by the field-piece. The softness of their character seems to allow a long dominion to a harsh political system; and a little more rugged energy amongst them would keep better in check the violence against which they now only direct a few enigmatic sentences.

Passing through, with some indifference, rows of arms, perhaps the spectator may have his attention momentarily arrested by the various specimens of crockery, earthenware, or china manufactured in the neighbourhood of Frankfort on the Oder. It is clear, solid, and generally of pleasing forms. It is scattered about the Building, but some of it is to be found on the north side, after passing through the first apartment from the east. It approximates more to our stoneware than to anything else that we are acquainted with, but is superior to that in its clear uniform glaze. For neatness and utility, it is scarcely surpassed in the whole collection. The porcelain, both of Saxony and Prussia, is, of course, much more splendid; some of that is very much to be admired, and seems to find numerous customers, for several of the articles of the Berlin manufacture were marked "disposed of;" but the porcelain, with its admirable paintings, comes within the reach of a few, while the elegant and clean-looking *thonwaaren* is attainable by the many, and must contribute to the pleasures of all who use it. This ware is largely exported to countries with which England trades; and we are inclined, therefore, to suppose that it must be as cheap as our ordinary ware, and it is, generally speaking, more elegant, and appears less brittle. Combined with several other things which come from Frankfort on the Oder, it gives us a much higher idea than we had before formed of that city as a place of manufacture.

From the very circumstance that much of the cutlery, particularly that from Solingen, is made after English patterns, it appears very good, and much superior to that which was formerly, and is still very much in use in Germany. Some of the surgical instruments, too, are very good, and are made better in Berlin than in any other part of Europe. Some of the common jewellery, the supply of which is large, is well set; but the bulk of it, as is to be expected from the quantity, is common, and rather tasteless.

Germany abounds in metals; all the zinc in use comes from there: but, with the exception of its being applied to roof a house, a model of which is exhibited, showing some very substantial workmanship, and for spouts, we noticed no other important application of this ductile, and now much used metal. Those who have visited Germany must be well aware that there are many uses to which it might be most advantageously worked, and would contribute more to the health and comfort of the Germans, and the neatness of their houses, than most of the poor articles they exhibit.

Passing to the West and North, opposite the room for the machinery of the Zollverein, we observe two specimens of massive safes for money and papers. One is remarkable for the ease with which its heavy doors are moved, and the other for the impossibility of opening it without receiving instructions from the maker, and both for their many conveniences. Four of them, we have seen it stated, have already been ordered from Germany, in consequence of their having been seen here.

The machine-room looks bare, and at least is quite spacious enough for the machinery the Zollverein chooses to place in it. We believe that Germany is richer in such contrivances than the Exhibition shews. We should pronounce it very backward, were we to judge of it solely by the specimens here. Cards for combing, made of imported materials, seem to us very inferior to those made in Manchester. Engines for coining, punching, and milling are good, but nothing extraordinary. The Jaquard loom and vacuum pan we have already mentioned, and the other machines are too trifling to merit notice.

Civilization and the power of man are directly in proportion as he is enabled by skilful machinery to command the assistance of nature. As he makes the expansive power of steam, or the weight of the atmosphere, or the rushing of streams, work for him, he is strong and powerful. Machinery being generally private property, men cannot be constrained to display it when they fear that the secrets connected with it may be discovered; and hence the samples in the Zollverein are not specimens of the best machinery of Germany. If they were, we should form an unfavourable opinion of the past, and a very unfavourable augury for the future of that country.

Now coming back to the south, we enter the great centre room of the Zollverein, crammed full of the *bijoux* of German art; but we must reserve what we have specifically to say of that and other parts of the exhibition of the Zollverein to another occasion.

CLAYS, SANDS, AND EARTHS, AND THE OBJECTS MANUFACTURED OF THEM.

THE estimate of value and interest attaching to natural substances, which form the basis of great manufactures, is often little proportionate to the real importance of the objects in question; and the general reader, as well as the visitor to a large collection, a museum, will be apt to pass them by for the more attractive *results* presented to his notice. Thus, amongst the visitors to the Great Exhibition, thousands examine and admire the porcelain and the glass, while few are found considering the clays and sands from whence these beautiful substances are derived; and this kind of indifference extends even to the simpler and more common manufactured products, when these are so widely employed as to attract no attention by novelty of appearance. Thus it is that the bricks, tiles, and other like objects, are readily passed by as being to a certain extent, and for most purposes—*raw materials*.

The collection of earths, sands, and clays, and simple manufactures from them, as seen in the Exhibition, possesses, however, much interest, and deserves more than cursory notice. The British part of it is arranged chiefly in Class 1 on the south-western side of the Building; but numerous specimens from various foreign countries may be referred to, and will repay the trouble of discovering them in many nooks and corners, chiefly on the south side of the central avenue. We may divide the whole into materials for the bonstruction of bricks, tiles, and other similar articles, including all kinds of refractory brick, materials for the manufacture of earthenware, pottery, and porcelain, materials for making glass, materials for agricultural use as mineral manure, and miscellaneous earthy minerals used for various purposes.

The qualities of a good clay for brick, and tile making are not so peculiar as to induce any difficulty in their discovery in most parts of Europe. The clay so abundant everywhere, or within a reasonable distance of most places where human beings congregate, is generally capable of being adapted for use in this way, and requires only that there should not be too large a proportion of alkaline earths, as potash or soda, although a little lime is no disadvantage. The uses vary with the quality, but, perhaps, we may mention as one of the best of all the clays exhibited, some specimens from the estate of Lord Enniskillen, Florence Court, Ireland, which, with articles made from it, are shown in Class I, (No. 116), and also in Class 9, amongst the agricultural implements. Some other samples of brick and tile clay are shown, but the variety is not considerable. They will be found in Class 1, No. 115, 119, 127, 127A, 128, 129.

The manufacture of bricks is somewhat largely exhibited, and several varieties of construction may be mentioned as new and interesting. Of these the hollow bricks shown in Class 27 (No. 124, and France 417). are the most remarkable, and best worthy of notice. The former, sent the Society for Improving the Condition of the Labouring classes, consists of a brick considerably larger than the common size, and having one large open hollow in the centre of a small recess in the top and bottom for mortar. Bricks thus made dry very quickly and thoroughly, and are admirably adapted by their comparative lightness for various purposes in fireproof buildings, and for party-walls. They are also much cheaper, bulk for bulk, than ordinary bricks, and we may fairly anticipate a very large consumption as soon as their great value becomes known and appreciated. The very curious and interesting machinery invented by Messrs. Bovie, and applied by them to a similar manufacture in France (No. 417), deserves notice also, as producing an amount of strength with a small consumption of material and greatly diminished weight, which, if in any sense economical in the first cost, must have an extraordinary value. These bricks of M. Bovie's manufacture are very much larger than those at present used or those just described, and can be made of considerable length if required. They are extremely strong, and must be very compact and readily dried. They contain several small hollows, and in this respect and the mode of manufacture are entirely new.

Other new kinds of bricks are exhibited by Mr. Workman (Class 27, No. 116), who has invented and patented a new process for rendering them waterproof at small cost; and by Mr. Haddon (Class 27, No. 114), who has manufactured them of a rhomboidal form, ensuring their bonding. There are also a number of ornamental bricks, of which some sent by Lord Lovelace (Class 27, No. 87) are interesting and ingenious; and others, by Mr. Ambrose (No. 128), also indicate taste and good material.

Amongst the foreign goods of this kind deserving attention, we must now turn to the bricks and tiles exhibited by the establishment of M. Miesbach (Austria, No. 610). The raw material is not sent with the manufactured article; but these latter are sufficiently varied, and the statements concerning them sufficiently remarkable, to justify an extended notice. From an authentic account before us, it appears that one brick and tile factory (the largest of several), belonging to M. Miesbach, and situated close to the city of Vienna, occupies upwards of 250 English acres, on which are drying-sheds 25,000 feet in length, adapted for common bricks, forty-three kilns, capable of burning three millions and a half bricks at a time, and more than 8300 feet of shed for moulding tiles and ornamental work. The annual make of bricks from this establishment is 65,500,000 of bricks, employing in all nearly 3000 persons in the manufacture. It should be observed also, that this is only one of seven large establishments belonging to and worked by the same manufacturer, who employs in all nearly 5000 persons, and sells upwards of 107,000,000 of bricks per annum. The colour and texture of the bricks and tiles are admirable, and the selling price is almost inconceivably low, considering the cost of fuel and the price of labour.

Besides briks and tiles of the more common kind. there will be found from various countries excellent specimens of tiles, both for roofing and paving, which do much credit to the exhibitors. The so-called *terro-metialic* of Mr. Peake, in Class 27 (England), No. 123; the collection sent by Mr. Hawood (Class 27, No. 127); and the Italian tiles of Mr. R. Brown, of Surbiton (Class 27, No. 147) are all very respectable, and indicate a satisfactory state of the manufacture. New forms of roofing tiles are exhibited by M. Amuller (France, 405); and various draining tiles, by many persons, chiefly English. Of all the objects of this kind, however, the mosaic tiles of Mr. Minton (27, 86) are much the most remarkable; and, as they involve an important peculiarity of construction, which may easily escape notice, the principle may be well worth describing in this place, especially as it involves a very simple application of raw material.

Up to the year 1839, there was no satisfactory method in use for manufacturing durable mosaic pavements at a moderate cost, and Mr. Singer in that year took out a patent for a mode of forming little cubes for mosaic-work, of ordinary porcelain, which, being arranged in patterns, was afterwards cemented at the back. A pavement of this kind is exhibited, (Class 27, No. 88), in which the tesserœ have been made in the usual way of porcelain clay, baked in separate cubes before being laid down. In 1840, Mr. Prosser, of Birmingham, discovered that if the

material of porcelain (a mixture of fine clay with flint) were reduced to a dry powder, and in that state subjected to enormous pressure between steel dies, the powder is squeezed into about one-fourth of its bulk, and compressed into a compact solid substance of extraordinary hardness and density, much less porous and much harder than common porcelain after baking. Cubes made in this manner, of coloured clays, and baked in the usual way, but either glazed or not, are laid down on a flat surface, and cemented into convenient shapes and patterns with fine Roman cement, worked in to fill the crevices between the blocks. The effect of this ingenious manufacture is singularly beautiful, and the durability perfect. Patterns are easily and accurately obtained, and the various intricate intersections of grotesque and arabesques outlines readily executed.

The material of which Minton's mosaic tiles are made is essentially a porcelain clay, and of such substance there is a large and most interesting group to be found in Class 1, No. 93 to 110; besides other displays of similar material from China and elsewhere. The China clays consist of the argillaceous or clayey part of decomposed granite, collected and sifted, either naturally or artificially, by the agency of water; but they include a larger percentage of silica (flint), to which a part of their value is due. Such clays abound in the neighbourhood of the granite bosses of Cornwall and Devonshire, and have hitherto been chiefly worked at and near St. Austell, where the supply is too large to be easily reduced. Recently, however, works have been erected on the southern extremity of Dartmoor; and of the material here obtained, and the porcelain made from it, examples are shown by Mr. Phillips (Class 1, No. 101).

A considerable quantity of clay, of coarser kind, is also obtained from Dorsetshire; samples of this are shown by Messrs. Pike (Class 1, No. 102) and Messrs. Whiteway, Watts, and Co. (Class 1, No. 90). In the manufacture of the finer kinds of porcelain, great care is taken in mixing the finest and purest clays with a due proportion of silica and other material, obtained partly from burnt and pounded flints, and partly from an exceedingly pure felspar known as china stone. Of the latter some extremely beautiful specimens from a vein recently worked in Cornwall are well worth examination, and are already in considerable use. Varieties of felspar from America have been occasionally introduced into the potteries, notwithstanding the cost of transport; and it is understood, that much of the beauty of the parian ware is due to the admixture of this ingredient.

Fire-clay is another substance of great importance, and of which many specimens, both raw and in various stages of manufacture, have been sent for exhibition.

The Stourbridge clay, of which Messrs. King and Co. (Class 1, No. 91) and Mr. Cowen (Class 27, No. 112) send good samples, together with various objects made therefrom, is one of the best known and most highly valued in this country. It occurs beneath the coal in the coal measure of Stourbridge (Worcestershire); and a similar, or nearly similar, material is very common, in like positions, in other parts of the country. Clay of this kind requires to be free from all alkaline earths, and from iron; but it is generally deeply-coloured by carbon, and most kinds exhibit a peculiar fracture, owing apparently to the condition of the clay. The articles made of it are gas retorts, fire-bricks, smelting pots for steel, brass, &c., where long exposure to intense heat is required. In the case of gas-making, the use of clay is now altogether superseding the iron retorts long employed, and the advantage is considerable in all respects; as, in this process, it is in the highest degree essential that the material and workmanship should be of great excellence, while the cost must not be excessive. The manufactory of Messrs. Cowen is well known for the excellence of the goods of this kind supplied, and their cheapness and the reputation of the house are well sustained in the Exhibition. The form and texture of the gas retorts, and the perfect state in which they are presented by their exhibitors, are highly creditable. Several excellent articles of the same kind are shown also from Belgium and France, although we may safely say that neither of these countries can be considered to have surpassed our own in material or workmanship.

Besides gas retorts and fire-bricks, we have also a good display of plumbago crucibles, or rather crucibles made of refractory clay, with which a large quantity of plumbago is mixed to render the whole sufficiently porous when used to allow of a small amount of expansion, and thus capable of resisting the most intense heat of a wind furnace. Mr. Ruel, of Holborn (Class 1, No. 435), sends a fine series of such articles, for which he has a great reputation; and some German makers have also forwarded specimens of their care in manufacturing remarkably large and beautiful plumbago crucibles, which have every appearance of being excellent. Kepellan (Wirtemberg, No. 28) and Coste (Belgium, No. 397), are, perhaps, the best-looking; but it is difficult to estimate their relative excellence without a trial.

While speaking of chemical apparatus, we must not neglect that of Messrs. S. Green and Co., of Lambeth (Class 27, No. 125), which is a model of ingenious and neat contrivances. A gigantic jar for acids, the largest, perhaps, ever made, and an angular worm of a still, which admits of access throughout for the purpose of cleaning, as well as an acid pump, are well worthy of close attention.

It is of course chiefly in connexion with manufactures that we can profess to give any special interest to the various kinds of clay; and thus, to come back to the main object of this paper, we would advise the reader to study chiefly such series as that exhibited by Mr. Minton (Class 1, No. 97), where the specimens all serve to illustrate processes; and that of Mr. Phillips and others, where the relation of clay and derived porcelain are very well shown. The former being the collection of a manufacturer, and chiefly illustrating the best processes of manufacture, while the latter are sent from the producer of raw material, and the objects being therefore quite distinct, they may well be examined together.

Besides the clays already referred to, there are several other kinds adapted to different uses in the arts. Thus we have the common, but purer kinds of clay used in works of terra cotta, or partly burnt clay, of which there are numerous and beautiful specimens in Class 27. A still purer, and much more plastic clay, is used for pipes; while a peculiar variety, containing a very large percentage of water (essential to its constitution, and not rendering the mass damp), is known as "fuller's earth," and is much used in the clothing districts for preparing cloth, owing to its remarkable power of absorbing grease. Large quantities are obtained from near Reigate, in Surrey; and the various stages of preparation are shown by Mr. Cawley (Class 1, No. 47), and Messrs. Gawkroger and Hynam (Class 1, No. 48).

SANDS are used for various purposes, and several kinds will be found exhibited in Class 1. Among these the casting sands of Sir T. Wilson (49) and Mr. Collinson, of Mansfield (75), are remarkable for all those qualities that give value to the material. The purity of the sand, the evenness of its grain, and the consequent smoothness which it presents, are all favourable for moulding and receiving the metal. Such sands are not found everywhere, and where they do exist bear a high price. They are often deeply coloured with oxide or silicate of iron, but this is not considered a disadvantage.

White sand is used to a large extent in glass making; and some of the best of this kind employed in London, Birmingham, &c., comes from near Aylesbury (Dr. Lee, 125), from the Isle of Wight (Claxton, 73, and Squire, 74), and from Reigate (Relf, 76, and Morrison for Earl Somers, 75). Till lately, no sand from any English locality was delivered in nearly so pure a state as that obtained in Paris and other cities on the Continent; but there is little reason why this should be the case, and there is nothing in the finer and better of our sands that renders them in any way inapplicable for the best purposes of glass-making, provided due efforts are made to remove the small impurities that can be conveniently got rid of. The sand exhibited by Dr. Lee, of Hartwell, and already referred to, is the finest and purest of those which are sent, and is of considerable value. Together with the sand will be found some objects of glass, such as prisms and globes, manufactured of it, to show its quality. These give a good opportunity of noting the absence of colour when a great thickness of glass is looked through.

Besides these finer kinds of sand, and others used for special purposes in the arts, there are also sent from the Isle of Man and Cornwall complete series of the earths and sands of the district. The latter are worthy of note in illustrating the use of calcareous and other sand for mineral manure. Many thousand tons of these fine sands, which consist of little else than comminuted shells, and retain a certain proportion of animal matter, are annually carted from the south coast of Cornwall into the interior, for the purpose of enriching some of the poorer soils. (See Rouse and Whitley, Class 1, No. 150.) Samples of another kind of Cornish manure obtained from fishes, and deodorised, are also exhibited in Class 1, at no great distance, by Mr. Gill, of Truro (Class 1, No. 38), although they properly belong to another class.

Together with sands of the ordinary kind, we may take the finer kinds obtained generally from river silt, or elsewhere, under very peculiar circumstances, and used in the arts as polishing powder, under the name of Tripoli or rotten-stone. Recent and very minute researches on the microscopic structure of the particles that give its peculiar value to this kind of substance have fully demonstrated that they are almost entirely the skeletons of infusorial animalcules living in infinite abundance in moist earth, an of such extremely small dimensions that millions would be required to form a cubic inch. Prepared Trent sand and Welsh rotten-stone are exhibited by Messrs. Flather and Haden (Class 1, No. 80.)

Ochres form a group of earthy minerals, coloured by metallic oxides, or consisting chiefly of them, which are exhibited not only in England (Class 1, No. 40 and 92), but in several other countries, of which we may mention Nova Scotia, Trinidad, Van Diemen's Land, and France. They are chiefly oxides of iron, and of red or yellow colour. Those sent by Messrs. Jenkins and Beer (Class 1, No. 92) are in different conditions, as used in the arts, and are of very good quality. The ochres from Bristol, forming part of the very interesting and carefully selected series of Mr. Howard (Class 1, No. 29), are also worthy of notice for their purity and depth of colour.

The earthy materials from which various kinds of cement are manufactured are represented in a few cases, but none of them are very remarkable. The Ipswich Museum committee have sent specimens of the mineral riches of their neighbourhood, including the well-known Harwich septaria, or stones from which Parker's and Roman cement is made; and from Greece we have some fine samples of puzzuolana, much used in that country for building. Gypsum and septaria from various parts of the country (especially Derbyshire and Lincolnshire for the former, and many of the clay districts for the latter) are shown by Messrs. B. White and Son (Class 1, No. 130) and Messrs. Blyth and Jacobs, for the purpose of illustrating the finished manufactures which they also exhibit. Both these substances require to be burnt and powdered before using; and as in this state they cannot assume the solid form without a certain quantity of water which they absorb greedily with the emission of heat, they are capable of being used, under management, as hydraulic cements, setting or hardening under water.

We have already referred to the mineral manures obtained from the sea-coast of Cornwall, and consisting of minute particles of shell accumulated in vast masses, and still retaining a portion of animal matter. There are, however, other substances found in the earth admirably adapted to improve the soils required to grow corn crops repeatedly, supplying that peculiar element, phosphorus, which seems absolutely needed as an ingredient in the food of man. Such material is obtained from animal manure of all kinds, but then rapidly disappears; and it is not long since the advance of chemistry, and its application to agriculture, has so clearly demonstrated both the fact and the cause, as connected with the fertility of soils, that the subject of mineral manures is becoming daily more and more important. The recent discovery, on the east coast of England and elsewhere, of actual deposits of gravel, consisting of phosphate of lime, and capable, by a little chemical manipulation, of forming a most useful material to mix with the soil, has tended to bring the subject more prominently forward, and has naturally been considered in preparing for exhibition the mineral products of our country.

These concretions of phosphate of lime were, no doubt, originally derived from the remains of animals accumulated in various beds during the process of their deposit. They have hitherto been met with in two positions only. In one of these, namely, amongst the sands (upper greensand and gault) near Farnham, and generally in the same geological series round the chalk hills of the south-east of England, they are apparently *in situ*, and are unquestionably accumulations modified, if not produced, long after the original formation of the rock in which they occur. In the other case they are found at the bottom of the upper beds of crag on the coast of Suffolk, and are manifestly accumulations of rolled pebbles once forming a sea beach, and derived from rocks of older date. Good examples of both these will be found exhibited, both by Mr. Paine (No. 36) and Mr. Nesbit (No. 46), but chiefly by the former, so far as the Farnham beds are concerned. The Ipswich Museum committee (No. 35), show a good series of the Suffolk nodules. The percentage of phosphate of lime in these nodules varies from 30 or 40 up to 70 per cent., and is sometimes even higher in small heaps. They are converted into a soluble superphosphate of lime by the action of sulphuric acid, and in this state are available for agricultural purposes.

Among the subjects fitly considered under the head of earths must now be mentioned one which will, at first, be thought out of place—we mean that which is commonly called *black lead*, or plumbago, but which is, in fact, a form of carbon, only different in condition from the coals so abundantly distributed in our country. Black lead is by no means a rare substance in nature, but in the compact and peculiar form in which it can be conveniently manufactured into pencils it is very seldom that blocks of any size are found. The best are from a single mine in Cumberland, which has not yielded any supply for many years. Others are obtained from Ceylon, Bohemia, Spain, and other places; and an admirable collection from all known localities of importance is exhibited by Mr. Brockedon (Class 1, No. 65), who also shows some interesting processes by which the powder, otherwise almost useless, is rendered available for the manufacture of fine pencils. Mr. Brockedon is not the only exhibitor of black leads, but the others chiefly exhibit repetitions of the same process. The peculiar mode of preparation consists in producing an extremely powerful compression of the particles when in a state of minute division, and is thus described:—The mineral in a state of impalpable powder is deprived of air under an exhausted receiver, and then condensed in a dry state, a mass weighing seven ounces being consolidated by two blows in a press, with a force of 5000 tons, leaving it perfectly compact and solid; and from these blocks slices are cut and inserted in channels in cedar, as is done in the manufacture of pencils from solid masses of black lead. The use of this process is so considerable that it has almost superseded the necessity for having the natural mineral in the rarer and more expensive form.

We have thus endeavoured to give the reader some idea of the general contents of the Exhibition, in the case of several groups of objects not very attractive, and for the most part only indirectly connected with such manufactures as are likely to attract notice. It is to be hoped that the really valuable and useful objects briefly alluded to will not be utterly neglected and lost sight of during the period of the Exhibition itself, surrounded as they are with more showy materials; and that when these more costly products shall be removed, the others may still remain, to be referred to by the mechanic and tradesman, as well as to instruct those who are being educated for various practical employments connected with the arts. That some selection should be made and retained from the raw material of this and other countries, is, indeed, highly to be recommended, and we believe that her Majesty's Commissioners have already sanctioned an application to exhibitors, suggesting that it might be advisable to retain such objects as have no great intrinsic value, except as representing the usual condition of materials having a more or less extensive use in the arts. There can be no doubt that the nucleus of a trade collection of industrial objects thus formed, and the existence of a convenient place for their preservation, would tend greatly to advance the best interests of manufacture in this country.

MACHINES EXHIBITED BY SHARP BROTHERS AND CO.

The well-known firm of Sharp Brothers and Co. have contributed some good examples of lathes for turning the wheels of locomotive engines and other purposes: the first of these is called a Railway Wheel-turning Lathe, having two face plates each of 7 feet diameter, adapted for turning a pair either of locomotive or railway carriage wheels of that size, when fixed upon their axle or otherwise, without torsion. Two tires may be bored at the same time, or a wheel may be turned on one plate whilst the boring or bossing of a second wheel is going on, being attached to the other face plate.

The extreme distance between the centres of this lathe is 9 feet 6 inches, so that axles and wheels of the broadest guage may be turned in it. The advantages of this machine are, that the two tools employed have self-acting motions, whereby one man is enabled to accomplish more than twice the amount of work than could be accomplished by lathes of the ordinary description.

The second machine to be noticed is a key-grooving or slotting machine, which is used for cutting the key-grooves in the bosses of railway and other wheels, up to any diameter not exceeding 7 feet; having also longitudinal, transverse, and circular self-acting motions, whereby it is particularly adapted for paring or shaping, internally or externally, crank-axles, crank-arms, connecting-rods, and other parts of locomotive, marine, or stationary engines.

The third is a planing machine, suitable for planing articles of metal not exceeding in size the following dimensions, viz. 6 feet long, 3 feet 5 inches wide, and 3 feet 5 inches high. In this machine the article to be planed is moved along by a traversing table, while the cutting tool is a fixture, being attached to a cross slide, and so arranged that the machine itself, having been once put into motion, causes the tool to cut either horizontally, vertically, or at any required angle, without the assistance of an attendant.

The horizontal shaping and planing machine we shall next describe. The peculiarity of this mechanical contrivance is that the tool has a variable motion of from one to six inches. The difference between this machine and the one last described is principally that of the tool moving while the article operated on is stationary. The tables are so arranged that horizontal and circular work is effected by self-acting movements of the machine, while irregular curves are planed by a motion requiring the attention and direction of the workman.

The fifth and last of the machines exhibited by Sharp Brothers and Co. is an improved Throstle or Spinning Machine, furnished with 96 spindles, which are arranged for cotton. The great difference between this machine and others of the same class is, that the spindles are driven by friction, instead of by bands. Thus, greater certainty is attained, and less power required; moreover, the flyer usually attached to such machines is dispensed with: thus, the spindles are driven at a much greater velocity, without injury to the machine. There are other advantages obtained by this mode of construction, which may be summed up in a few words:—One-fifth of the space usually occupied is saved; a much smaller quantity of oil in working the machinery is required; and the alternation of weather and temperature have no injurious effect upon the machine which is thus worked by a more uniform amount of power.

ON THE GUTTA PERCHA CONTRIBUTIONS TO THE GREAT EXHIBITION.

IT is not quite eight years since the substance called Gutta Percha was transmitted from Singapore to Mr. F. Whishaw, as secretary to the Society of Arts, for the purpose of subjecting it to a rigid examination, in order to ascertain whether it would be desirable to collect it in large quantities, which were easily obtainable in that island, so that as a new article of commerce it might, with as little delay as possible, be introduced to this country. The samples sent to the Adelphi, by Dr. Montgomerie, were contained in a small deal box, and consisted, first, of the juice of gutta percha in a bottle; second, thin pieces of the substance, in appearance somewhat resembling leather; third, the gutta percha in its concrete state; and, lastly, lumps of the gutta percha formed by agglutinating the thin pieces together by means of hot water.

Chemists, manufacturers, and others were all anxious to obtain small pieces of the material, for the purpose of making experiments therewith. Among these applicants, Mr. Charles Hancock was foremost; and while the chemical committee of the Society were waiting for the reports of practical men on the subject, this enthusiastic gentleman having had permission to possess a very small piece of the substance, made himself so thoroughly master of the nature of gutta percha, that it was not very long before he took out patents for machinery suitable to the manufacture of articles for various useful purposes to which it has been applied.

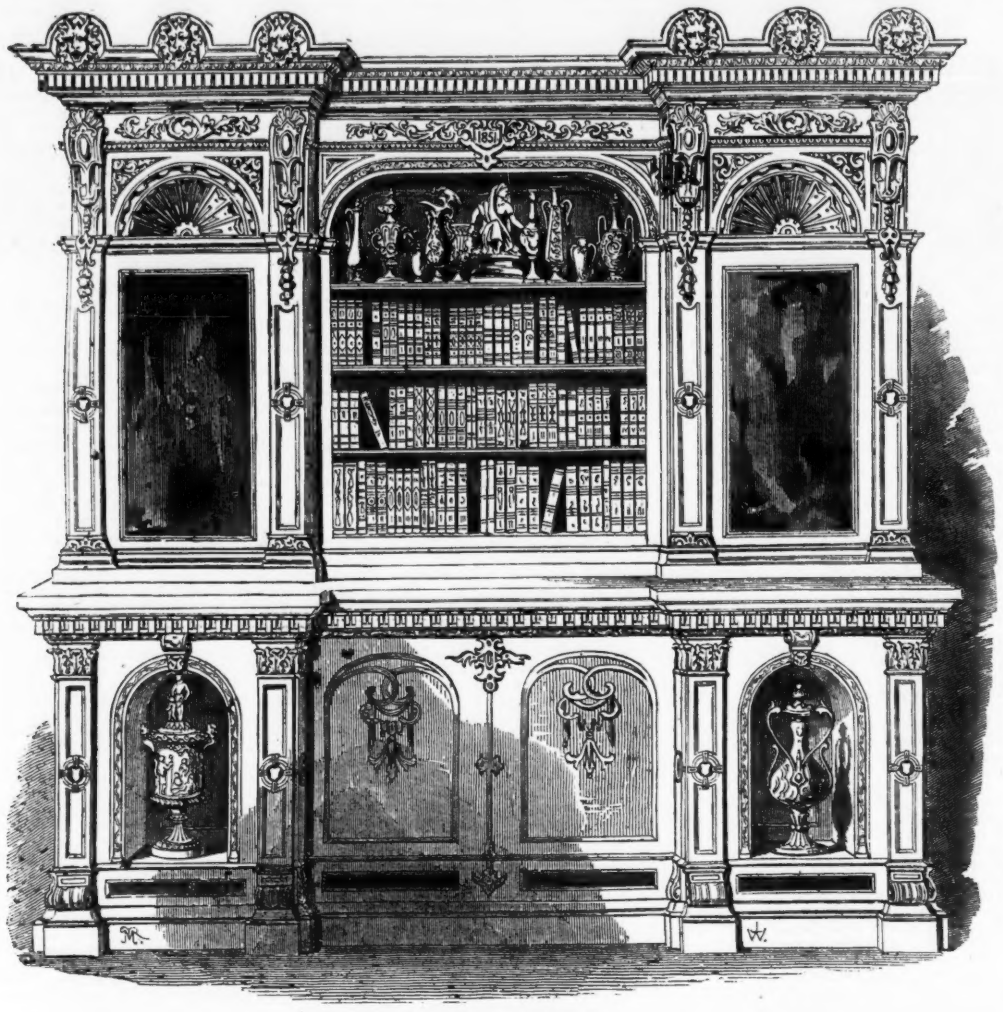
In the meantime, however, the secretary of the Society of Arts had made a variety of experiments with this highly interesting substance; the result of which was, that, at one of their weekly meetings, he was enabled to repeat his experiments before a full meeting, and produced on that occasion a pipe and a lathe-band, and covered a soda-water bottle with a thin coating of the substance, by immersing a lump of gutta percha in hot water, next rendering it quite hard by immersing it in cold water, and then removing the whole, and forming it again into a solid lump by dipping it once more in hot water and kneading it with the hands. Impressions of medals which had been produced by the same gentleman, were also laid before the meeting,

Two of the staple articles of the gutta percha manufacture—viz. a pipe and a lathe-band, as made by hand, previously to the introduction of machinery for that purpose—are exhibited by Mr. Whishaw on the western "wall space" of the Telegraph section, in the Middle Gallery North, and numbered 419, Class 10, in the Catalogue. Next to the raw material exhibited by Messrs. Bunn and Co., No. 77, Class 28, the above-named samples of manufacture should be examined before the visitor looks at the numerous specimens of gutta percha articles manufactured by machinery.

Previously to noticing the various applications of gutta percha which are to be found in many parts of the Great International Exhibition, it may be as well to give our readers some notion of the nature of the tree from which this material is collected, and of its chemical composition. Singapore and Borneo appear to be the only countries at present known in which gutta percha can be obtained in large quantities; it is the concrete juice of a large forest tree of the same name. Its trunk is straight and lofty, and about three feet in diameter at its base; its branches are numerous, having ascending terminal buds, which are white from exuding gutta; the timber is hard, and sometimes used for building and other purposes. The proper mode of obtaining the juice is to tap the trees periodically; but the plan which was at first adopted by the Malays was to cut down the trees, regardless of the injurious effects on commerce, in order to obtain for immediate sale as much of the juice as possible. In the conservatory of Kew Gardens some young trees were planted, under the direction of Sir W. Hooker, the superintendent of that delightful retreat; but, from some unexplained cause, the experiment was unsuccessful. Contrary to the opinions generally entertained by several chemists, who have paid some attention to the subject, Mr. Cane, a very intelligent and scientific chemist, of Dublin, who has devoted more time, perhaps, than any other person to a complete analysis of the material, reports that it is "a simple carbo-hydrogeneous substance," and that in its ordinary state it is composed of at least two distinct materials, besides a notable proportion of sulphur. These two materials are first gutta percha in its pure state, which is a white matter, and second a pulverulent substance of a dark brown colour. The mode of separating these two substances is exceedingly simple: a dilute solution of gutta percha is made in chloroform or in bi-sulphuret of carbon, and, after a repose of some time, two very different strata are obtainable, the one being the solution of the white or pure gutta percha, while the other consists merely of the brown insoluble matter floating on the denser solution: the white or pure gutta percha is obtained by separation and evaporation; and by repeated washing with the solvent the pure material is readily separated from the brown substance, which can then be obtained in a pulverulent form.

In the admixture of foreign matter with gutta percha the material is very much reduced in strength, as has been ascertained by many persons, who, in order to place a cheap article before the public, have tried every kind of substance to bring down the cost. Thus, the handles of whips, which have been made of some of these unnatural mixtures, have been sent back by the purchasers to some of the manufacturers in the shape of dust. The same may be said of a spurious article *called* gutta percha, used for covering telegraph wires, which, after a short time, was found to be in the same state as the residue of the whip handles. One person was foolish enough to take out a patent for an admixture of powdered glass with gutta percha, specimens of which, after exposure to the atmosphere for one month, we found to be wholly disintegrated. The only substances which are found to be beneficially applicable for the purpose of mixing with gutta percha, are caoutchouc, which belongs to the same family of plants, and plumbago, or black lead; in both cases the admixture of the two substances respectively being only about one-ninth of the weight of gutta percha. Pipes and bands made of gutta percha should not be used for twelve months after being manufactured, as they are found, when in an unseasoned state, to contract to a very great extent. Under the influence of heat and pressure, gutta percha will spread to a considerable extent, and more so if mixed with foreign matters. If we except plumbago, all the mixtures of gutta percha and other substances are found to increase its power of conducting heat. In its pure state, gutta percha is an excellent non-conductor of electricity, and is therefore extensively used for insulating the wires of electric telegraphs. By heat, gutta percha assumes a darker colour, and the effect of heat on foreign colours mixed with the gutta percha is to give them a deadened appearance.

Perhaps there is no process more highly interesting than that of the manufacture of gutta percha by machinery, which is chiefly carried on at the gutta percha works near the City-road, and at Hancock's factory, at Stratford. Although the processes, as carried on at these two extensive establishments, may differ in some of the details, yet the general *modus operandi* may be thus described:—The crude blocks of gutta percha, as received from the docks, are in the first place cut into slices by means of a machine formed of a circular iron plate of about sixty inches diameter: in this iron plate are three slots placed radially for the reception of as many knives or cutters; the blocks being placed in an inclined wooden shoot, an end of each is set in the plane of rotation of the cutters; the slices thus cut off are transferred in baskets, though machinery might readily be applied for the purpose, to a wooden tank containing hot water, in which they are left to soak until they are found to be a plastic state. The next part of the process is to subject the material to the action of a *mincing* cylinder, somewhat similar to that used by paper-makers for the conversion of rags into pulp: afterwards, the whole is thoroughly cleaned in cold water tanks; and when the gutta percha is found to be very impure, which is frequently the case as an article of commerce, a solution of common soda or chloride of lime is added to the water. From the cold water tanks the material is conveyed to the masticating machine, in which it is secured by the doors being bolted down. By this operation it is subjected to very great pressure, and this part of the process is the same as that used in the manufacture of caoutchouc. From the masticating machine it is passed between large metal rollers, and thus converted into extensive sheets, of thicknesses regulated by the distance between the rollers. Sometimes it is passed two or three times between the rollers. These sheets are cut into bands of various widths by vertical knives placed at the end of the web or cloth by which the



CABINET.—BY TANNER.

sheets are moved away from the rollers. The sheets are either cut into the proper width for lathe bands, or are stamped out for shoe soles, and various other purposes. For making tubes or pipes of gutta percha, a mass of the material is carried from the masticator to a horizontal metal cylinder furnished with a suitable piston, by which it is pressed forward into a die box kept hot by steam; at one end of

POPLIN PATTERN.—MESSRS. ATKINSON, DUBLIN.

the die box are a series of perforations through which the plastic material is forced into a cup, from which it passes out round a core, in its proper tubular form, into a long tank of cold water, through the whole length of which it is drawn by a line passing over a pulley, and returning to the person in attendance on the machine. The pipes are then coiled up and removed to the store-room.

Another important application of gutta percha is that of covering the wires used in the transmission of electricity, either for telegraphic or other purposes. With this view, a contrivance somewhat similar to the tubing machine is used; but, instead of being made hollow, the gutta percha is drawn out into the tank of water with its continuous core of copper or iron wire within.

Before concluding the present notice, we may mention that Dr. Montgomerie, through whose disinterested act the British public became acquainted with the use of gutta percha, received the large gold medal of the Society of Arts, which, in addition to the gratification of doing good, is the only reward he has received for the introduction to this country of a substance the uses of which are but as yet partially known.

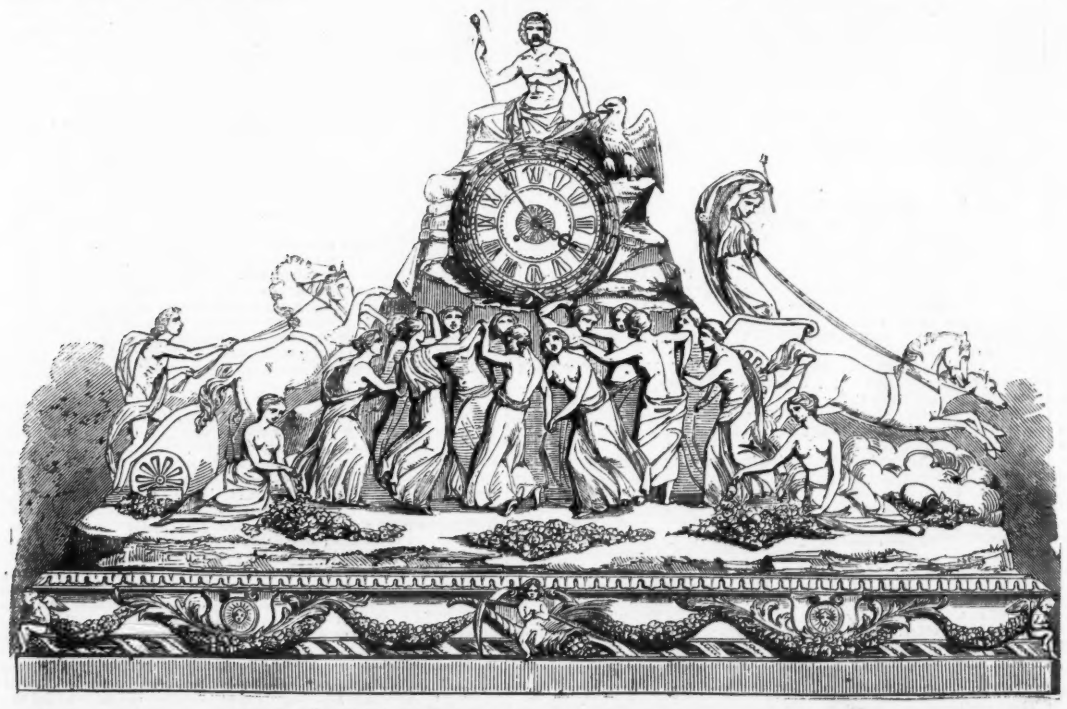
In our next notice of gutta percha, we shall bring forward the various applications of this really important substance which have been contributed to the world's great industrial display.

CABINET. BY W. TANNER.

The design of this Cabinet is very chaste and elegant, and is the more creditable as being entirely the work of an operative cabinet maker of Bath. We should be glad to notice more frequently attempts of this kind, on the part of workmen, to elevate their position by the development of their inventive faculties. The style of this piece of furniture is of the period of Francis I., the material Riga and pollard oak. The effect, in our opinion, would have been better if the latter had been omitted, and the wood all of one colour; as for the ebony slab, it is decidedly too heavy to harmonise with the rest of the work. These are, however, errors of judgment, which may easily be avoided in future. The finish of all the parts, the ornamentation of which is rich without heaviness or redundancy, exhibits admirable workmanship.

POPLIN PATTERN. ATKINSON.

We give another of Messrs. Atkinson's poplin patterns—an elaborate scroll work, which, wrought out in colour and gold, is remarkably effective.



OR MOULU CLOCK.—HOWELL AND JAMES.—DESIGNED BY MR. ADAMS.

OR MOULU CLOCK. HOWELL AND JAMES.

Amongst the elegant display of jewellery and decorative articles exhibited by Messrs. Howell and James, is a clock, after an exquisite design by Mr. Adams. It represents the hours dancing round Mount Olympus; and is finished with remarkable delicacy and artistic effect.

FURNITURE IN PAPIER MACHE. BY JENNENS AND BETTRIDGE.

This little group represents three of the numerous elegant productions

PAPIER MACHE FURNITURE.—JENNENS AND BETTRIDGE

in *papier maché* exhibited by Messrs. Jennens and Bettridge. The *légère* chair is of extremely graceful design, which is original and has been registered. The table and fire screen have all the lightness and delicacy of finish which suit them for a lady's boudoir. It is in these fairy-like productions of diminutive proportions that the light and highly ornamental material employed by Messrs. Jennens and Bettridge is most successfully introduced. To large and heavier works it is not so appropriate.

PORCELAIN CANDELABRUM. BY LAHOCHE.

Lahoche, of the Palais National, has a very fine display of porcelain and crystal, in dinner services, clocks, vases, lamps, &c. That which we have engraved is a handsome lamp or candelabrum in porcelain, and or moulu. The designs upon the former are painted in rich colours upon a pale blue foundation.

PORCELAIN CANDELABRUM.—BY LAHOCHE.

NEWSPAPER ONE PENNY

MALACHITE DOOR AND VASES.—FROM RUSSIA.

MALACHITE DOOR AND VASES FROM RUSSIA.

The magnificent and unique productions in malachite, exhibited by the Demidoff family, are justly objects of great admiration in the Russian Court. The labour involved in their production must have been immense, malachite being a mineral found only in small pieces, which have to be joined together by a peculiar process to form such works as those before us. The doors are of stately size, highly polished, and enriched with or moulu. The vases are all of different forms, each very beautiful, and are also embellished with or moulu.

FISH-KNIFE, FORK, AND SPOON. BY LISTER AND SONS.

The fish-knife and fork are very happy and effective in design: the handles are of ivory, richly carved. The spoon is of a scroll pattern, very neat, and appropriate for general use.

FISH-KNIFE, FORK, AND SPOON.—BY LISTER AND SONS.

DIAMOND AND RUBY STOMACHER. MOREL.

Here we have one of the gems and glories of the Exhibition, which fairly rivals in attraction the Queen of Spain's jewels and the "Koh-i-noor" itself; a truly sumptuous production, upon which the jewellery trade of England might be bold to stake its reputation in face of the world. It was originally intended and destined as a bouquet, but is equally, perhaps more appropriately, available as a stomacher; moreover, it is so constructed as to separate into several distinct pieces of jewellery, according to requirement. The diamonds are all of the finest water; and the rubies are described as "an unique collection." The setting is contrived with springs, resulting in a waving or slightly oscillating motion when in use, which displays, to the fullest extent, the brilliant colours of the stones.

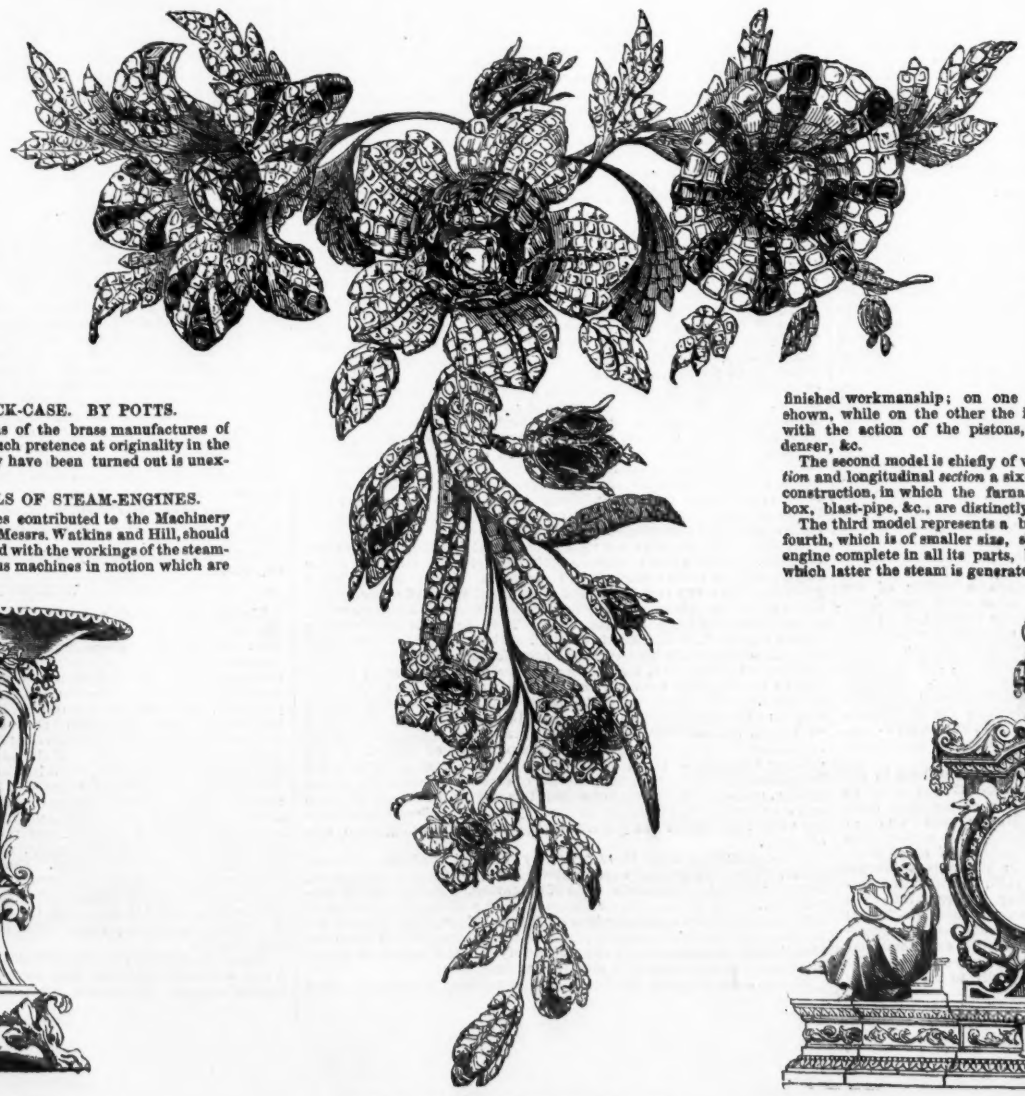
FLOWER-STAND AND CLOCK-CASE. BY POTTS.

These are two very happy specimens of the brass manufactures of Potts, of Birmingham. There is not much pretence at originality in the design, but the manner in which they have been turned out is unexceptionably meritorious.

WATKINS' AND HILL'S MODELS OF STEAM-ENGINES.

The sectional models of steam-engines contributed to the Machinery Department of the Great Exhibition, by Messrs. Watkins and Hill, should be examined by all who are unacquainted with the workings of the steam-engine, before they inspect the numerous machines in motion which are actuated by the power of steam.

FLOWER-STAND.—BY POTTS.



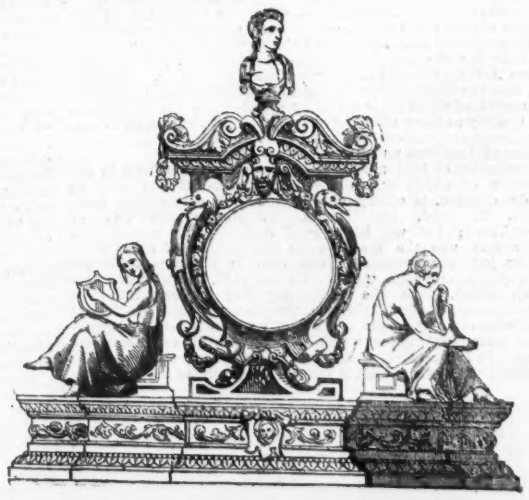
DIAMOND AND RUBY STOMACHER.—BY MOREL.

By these illustrative sectional models all the internal actions of the different kinds of engines represented are clearly shown; but it is much to be regretted that these models are not rendered more useful by the attendance of a mechanical person appointed by the Royal Commissioners, in order to afford the necessary explanations to the thousands of inquiring visitors, very many of whom enter these sultry regions, exposing themselves for a long period together to a sort of shampooing process, for the express purpose of gaining knowledge with regard to a subject which is but little understood by the great masses of the people.

The first of this series of models is of a condensing steam-engine, motion to which is given by a pulley-line from one of the neighbouring engines. This model is chiefly constructed of brass, and is a piece of finished workmanship; on one side the exterior of the machine is shown, while on the other the interior is clearly laid open to view, with the action of the pistons, clacks, and valves, air-pump, condenser, &c.

The second model is chiefly of wood, painted, and represents in *elevation* and longitudinal *section* a six-wheel locomotive engine of ordinary construction, in which the furnace, tubes, cylinders, cranks, smoke-box, blast-pipe, &c., are distinctly shown.

The third model represents a beam marine steam-engine; and the fourth, which is of smaller size, shows not only a condensing steam-engine complete in all its parts, but also the furnace and boiler, in which latter the steam is generated.



CLOCK CASE. BY POTTS.

PORCELAIN, EARTHENWARE, &c.

THIS important branch of industrial art is one which cannot have failed to prove of great interest in a marked degree to those who have already visited the Great Exhibition; and to those who have yet to realise this almost universal desire, it cannot fail to prove a leading feature of attraction; for whether we look at the results in an artistic, industrial, or utilitarian point of view, we find its interest to be precisely the same, since all are combined in an eminent manner in the various departments into which the china, porcelain, and earthenware trades are subdivided, and in no other branch of our national industry is the value of industrial, scientific, and artistic operations so marked in relation to the materials o be acted upon by the skill of the worker. A portion of clay, the value of which may be the smallest fraction of our smallest coin, is, by the skill of the potter, converted into vessels for use or ornament, and almost with the rapidity of thought the plastic material is raised under the ready fingers of the potter into an article of beauty and utility. Chemistry lends its aid in colouring and vitrifying the form which the simplest mechanism has produced, and art gives expression to that colouring in the due distribution of tints, or in the arrangement of the forms in which they shall appear. This, too, takes place in the finest specimen of porcelain, as in the humblest example of earthenware; and the two extremes meet in this identity, so far as the leading features are concerned, of the operations by which they are produced.

There are few things more interesting than the tracing up through successive ages the progress of the art of pottery; for, when textile and even metallic manufactures have perished by time and exposure, the fictile remains of bygone ages have been preserved to us, and, in many instances, have proved of eminent value as records of the habits, costumes, and ceremonies of peoples long since passed away. The material, from its earthy character, has served to resist the action of ordinary decay, and give to modern times pictures of those things of which all other record was completely lost. Nineveh, Egypt, Etruria, and ancient Rome have come down to us all the more vividly for their fictile remains, however much their architectural monuments may have enabled us to confirm the facts of written history or tradition, since, in every age, an advanced stage of civilisation would appear to have been evidenced by a high condition of the fictile arts. Varying in purpose, in style, and method of production, in decoration and general effect, these remains of antiquity always convey to the thoughtful observer a strong individual perception of the genius of the country and age in which they were produced. It was, however, reserved in this, as in other departments of industry, for the skill and invention of modern times to render this art subservient to the wants and comforts of the masses of the people; and the immense commercial development given to the manufacture of porcelain and earthenware is one of those manifestations of industrial progress which the social wants of an age like the present could alone bring forth. No longer confined to the exclusive purpose of sacrificial ceremonies or monumental records, these fictile arts have become the agents of domestic comfort in their uses, and of intellectual refinement in the beautiful forms in which they come before us; and, with due care and attention on the part of those in whose hands the manufacture and distribution of these examples of modern skill are placed, they may become, to a far greater extent than at present, the means of a wide-spread education in those arts, which all are agreed tend to the ultimate elevation of human character. Nor can the numerous inventions and adaptations of even the commonest earthenware vessels to the purposes and requirements of society be overlooked, as tending to produce domestic habits of cleanliness and order, where, but for the economic uses to which modern ingenuity is ever seeking to adapt its productions, discomfort and the baneful influences of a neglect of the simplest sanatory laws would obtain. It is, therefore, under the two aspects of use and decoration, that we desire to look at the illustrations of the present position of china, porcelain, and earthenware manufacture, as evidenced in the display before us.

Here, then, we have placed for examination and even for comparison the productions of the Royal porcelain manufactories of Sèvres, Munich, and Meissen, on the one hand, as the exponents of the highest manifestations of skill in fictile design, of which modern means are capable; and, on the other hand, the results of private enterprise and the persevering energy of the British manufacturer, in seeking to supply the wants and meet the tastes of the masses of the people; as displayed by the production of the Staffordshire Potteries, of Worcester, and other localities in which these branches of industry are carried on. There were few points in connexion with the early progress of the Exhibition, which created more distrust on the part of our manufacturers than the uncertainty as to how far these Royal or Government manufactures on the Continent would be permitted to stand in competition with the results of the private enterprise of our manufacturers, as regards the honours to be awarded to those whose works appeared to call for suitable recognition; inasmuch as the injustice, and, indeed, the absurdity, of placing for comparison articles made for the markets of the world, with those in which perfection as works of art was the only aim, let the cost, in time or money, be what it might, was obvious. In fact, our manufacturers justly felt that there was, in reality, no point of comparison to which, in common sense and justice, they could afford to submit. The difficulty, however, was got over by the decision of the Royal Commission, that the industrial works of the porcelain manufacturers of England could in nowise be placed in the same category with the fine art works of an establishment supported by the respective states of the Continent, not so much for industrial purposes, but as a means of example and refinement in the taste of the people.

THE STAFFORDSHIRE POTTERIES.

This important district first claims our attention, because it is at once the exponent of some of the highest manifestations of china manufacture, as of the more common earthenware produced for the ordinary wants of everyday life. The tables of the palace and the cottage are at once furnished from this, one of the most interesting localities, in an industrial point of view, to be found in the world; and, when it is considered that the greater portion of the development to which the various branches of the potter's art has attained, has taken place almost within the memory of living persons; that new modes of production have given, as usual, a new impetus to almost every department; that artistic taste and skill, which was formerly the rare exception as in the case of Wedgewood, has now become, in a great degree, the rule of action, although the full realisation of that rule may be far from complete, we see here, as elsewhere, when carefully considering our manufacturing systems, that in every pursuit the Saxon mind has but to receive the necessary momentum at the right point, and the problem, whatever it may be, is at once in progress of solution.

To those who carefully examined and noticed the condition of the Staffordshire potteries some fifteen years ago, and saw how little improvement had been made since Wedgewood's time, and how much had to be done without any very apparent means of doing it, since the workers had much to learn and no one to teach, it must be a source of astonishment and satisfaction to find that so great a progress has been made, and, being now fairly begun, must of necessity go forward. The introduction of the comparatively new material of Parian for statuettes and ornaments generally, has given a feeling of art to those productions which the old bisque body never could have done. The rich transparent tone of the Parian, giving the reflected light and semi-opaque shadows of marble, contrasts so unmistakably with the grey-looking tint and hard effect of the bisque, that no one can wonder that the latter is now completely superseded in England, for all works in the Fine Art department of the porcelain manufacture. We trust, however, that the manufacturers will not allow themselves to run wild in this material, of which there are many symptoms in the Exhibition, but keep steadily to those articles and subjects which, in size, style, and method of treatment, will enable them to do full justice to themselves, and the beautiful medium now placed at their disposal.

The introduction of Parian into general use for the objects to the representation of which up to the present time it has been so successfully directed, is chiefly due to the two enterprising firms of Messrs. Copeland, and Messrs. H. Minton and Co., of Stoke-upon-Trent; but we have good authority for saying that the former firm was the first to solve the problem of its applicability under judicious treatment; not that in this respect Messrs. Minton's claim is one whit the less for the skill, talent, and enterprise with which, from the beginning they entered into the race for excellence; and in all the examples shown by these two houses we have the result of the great amount of experience, artistic knowledge, and manufacturing tact which their great past experience has given them. In Messrs. Minton's display of Parian there is little left for the most fastidious to wish; and, in spite of our desire to see the application of it kept within those legitimate bounds as to size and use, to which its character best fits it, we are compelled to admire the beauty of the *Renaissance* chimney-piece, because the design has been so thoroughly adapted in all its parts to the requirements of the material. The caryatides are spirited and expressive, the ornaments appropriate and graceful, and the whole well fitted together. The painted porcelain panels, too, add to the effect in no mean degree. On the shelf of this chimney-piece are three novelties in statuettes. The Flora is rather overstrained in *pose*, though there are excellent points; and of the pair of the Amazon and the Warrior, we are inclined somewhat to question the taste of the former, though the execution and spirit are very admirable. In both there is an enormous amount of energy and power.

A wine-cooler, decorated with cleverly designed incidents of the chase, in which the animals are modelled with great accuracy, the figures of the controlling sportsmen, or boys *en costume*, being very spirited, is an excellent example. The vine, as festooned around the whole, is charmingly treated, and the crowning group of figures, with an emblematic barrel of bacchanalian dimensions, is original and pleasing. The heads of the boar and fox are very finely executed. There is a second example of this piece, in which gilding is used as a means of decorating certain salient points, but to our mind the Parian in all its integrity is the best. Another work in Parian is a centre-piece, with fine emblematic figures of the seasons, very beautifully treated, the figures being well designed and modelled, the *pose* of the "Winter" being very grand, and the treatment broad. In colour, the light blue, gold, and Parian produce a most harmonious result. Another example is a jelly and ice stand, very tastefully arranged, the group on the top, with the scrambling little figure eager to seize upon that which is far out of reach, is very pretty. The floral ornamentation too, of the cups, &c., is exceedingly well painted, being neat, broad, and effective. The centre-piece, or dessert stand, with the two reclining figures in eastern costume, we do not like. It is neither tasteful nor interesting, no intention being visible. Another, however, with three genii at the angles, is very good. These figures are beautifully modelled, the leading features of the colour and gilding being the same as those we mentioned above as being so chaste in effect.

In statuettes, the reduced copy of Power's "Greek Slave" deserves marked attention for the excellent manner in which the expression and sentiment of the original has been preserved. This, however, is only one out of many which either have been or are destined to be very popular. "The Babes in the Wood," after John Bell, and a statuette of the late Sir Robert Peel, possess excellent points, though widely differing; and a group of Cupids with a goat, or rather two treatments of the same subject, forming a pair, are remarkable for excellence of drawing, modelling, and the florid character of the treatment.

Minton's china has ever been esteemed for its tasteful colouring, and the treatment of the smaller floral subjects; and on this occasion the reputation of the house has been duly sustained.

In dinner services, the plates are of an excellent character, the execution of the painting being at once delicate and effective, and without any overstrained effort after neatness: that quality is obtained in a satisfactory manner. The centres, too, are usually sufficiently subordinate to the border, a point which ought to be laid down as a principle in the decoration of a plate. In tea and breakfast services the cups and saucers are generally very elegant in effect.

With the exception of the two large vases standing on each side of the Parian chimney-piece, we cannot admire the vases or scent-jars of this house; for there is a want of form in most of them, which, in spite of beauty of colour and manipulation in painting, gives them an unsatisfactory appearance. The large vases, however, are an exception; the forms being bold, clear, and well pronounced, and the decorations simply part of the general form. The metal casting and chasing of the handles, too, strike at once, and the effect of the whole is satisfactory for such large objects.

In the less costly articles, Messrs. Minton make a very interesting display, and some of the articles for the toilet are very elegant. The new process by which lithographic printing is brought to bear in the coloured decoration of earthenware, is here illustrated in two excellent examples, one being decorated with the ivy, the colour, and light, and shadow being well given; the other being a composition of the bryony, very nicely rendered as an ornament. On the whole, this exposition of Messrs. Minton's current productions is a most satisfactory and interesting one.

In Mr. Alderman Copeland's (2) display, Parian is again in the ascendant, and certainly its rich and delicate tone contrasts well in the overwhelming light in which the china, &c. is placed. Of this light the exhibitors have some right to complain. Some have attempted to overcome the difficulty by having glass cases, but we think this rather aggravates the evil. Both Minton and Copeland have avoided this, and displayed their wares in all their integrity, and certainly, under all circumstances, to some advantage. The Parian statuette of "Sappho," from the original by Theed, in the possession of his Royal Highness Prince Albert, strikes from its size, being probably the largest figure yet produced in the material; but for that very reason we think it is not so covetable as many of the higher class statuettes, out of the forty examples exhibited by this house. The hands and feet seem out of proportion to the head. This may be a fault of the original, but it is quite as likely to arise from, or be exaggerated by, unequal firing, which we think a fatal objection to attempting large works of th skind. Under any circumstances, the shrinkage of a material so variable in this respect as Parian, is likely to be more regular in a statuette of sixteen inches high than in one of thirty-five inches; for when it is remembered that this shrinkage invariably reaches one-sixth, the calculation of the proportion to fairly accomplish a thoroughly good work, even when small, is no indifferent item in the skill employed in producing the result. The "Ino and Bacchus" of Foley has been admirably reduced, and, with an appropriate pedestal, stands out with peculiar grace and fitness. This is a beautiful subject for the crowning ornament of a decorated clock, and, with suitable bronze adjuncts, would look even better than it does as a single work. The "Dancing Girl reposing," by Marshall, is very charming; and the head of a young fawn, draining the "Last Drop"—the title of the work—from a drinking vessel, is admirable. The lower extremities of the figure, however, have a "wooden" look. Durham's elegant bust of "Jenny Lind" is, to our minds, the best in Parian yet published. Many of the other examples are tolerably well known to our readers, by occasional illustrations either from the originals or from the Parian reductions. Probably the greatest novelty, certainly in the Parian, is the "Tripod Flower-stand." The design is classic and appropriate: it is beautifully modelled, and the difficulty of uniting the parts has been well got over. The example in terra cotta is also very meritorious.

The slabs for fireplaces are very noticeable features in Copeland's examples, the greater portion of them being excellent in style and execution. Those in which a trellis-work is painted at the top, from which is suspended an arrangement of the convolvulus in one slab, and the passion-flower in another, are very complete and appropriate. The painting of the flowers is broad in hadling, and artistic in colour and effect. Indeed, this mode of treatment characterises all the works of this house, whether dinner, tea, or coffee services; the plates being always broad and effective, the cups and saucers neat, and with the same quality in an appropriate degree. Several table-tops are worked up in this style with remarkable success.

In toilet slabs, the Etruscan style of ornament is brought in very successfully, and the effect of mosaic-work well given. The size of the slabs, and their truth of surface, is remarkable. Of vases there are a great number, many very chaste and elegant, others a little over-done in the details of decoration. The leading forms are classic, but modern modes of ornamentation have been resorted to. The painting in some of them is very excellent, in others not so good. Those decorated with landscapes, cleverly as the landscapes are executed, are contradictions to all the laws of perspective, for nothing can be more undesirable than to paint a landscape on a convex surface, the form being the very reverse of the representation, since the most distant part of the picture may thus be brought nearest to the eye. But people *will* have these kind of things, and so manufacturers *must* make them. On this head we shall have more to say when visiting the products of Sèvres. Before quitting Copeland's vases, however, we would direct attention to the large blue and gold specimen, as worthy of especial notice for its colour, gilding, and surface. In point of colour, this display is rich and effective, and a tint, which has been named the "Queen's colour"—a very charming violet tint—comes as a grateful variety to the everlasting blues and crimsons.

In the commoner ware there are many excellent specimens of dinner pieces. The plain printed ware in new colours, and in an equally novel, because very bold and artistic style of engraving, will bear careful examination. One plate, with an Etruscan border of excellent design, is, however, spoiled by a commonplace landscape subject, which good engraving could not redeem, being placed in the centre. If this were replaced with an appropriate patera of the style of the border, it would be the most perfect plate of its kind we have ever seen.

Messrs. John Ridgway and Co., of Cauldron-place, Shelton (5), afford an agreeable contrast to their neighbours by exhibiting no Parian, and contenting themselves with a first-rate display of the utilities of the pottery trade, more especially as applied to sanitary purposes. Their pottery "fountain hand-basons," in a variety of forms, give evidence of a close attention to the special want they are intended to supply; and whilst doing this, care has been taken that the wealthy can have any amount of elegance and decoration which taste or caprice may suggest, whilst the purchaser of humbler means and aspirations may have those useful articles which his requirements may render necessary, at the most moderate cost. More cleanly, useful vessels it is impossible to conceive, whilst there has been much care and consideration bestowed upon their appearance, as decorative adjuncts in a chamber.

Mr. Ridgway also exhibits a stair-rail in earthenware. The gilding is somewhat out of taste, being carried a little too far; but, in many points, it is suggestive of beauty in similar adaptations. This over ornamentation is a point we shall have constantly to find fault with in this department of industry, for our porcelain manufacturers seem to think they can never, by any possibility, do too much. In the examples of dinner-services, for instance, in the contribution under consideration, the plates are overloaded with painting and gilding; the former being hard in handling, and indifferent in drawing. The plain and gideel articles are effective and satisfactory—one soup-tureen being very excellent. The conservatory fountains are objects of some pretension, and in many respects are well adapted to their purpose. There is a light and brilliant appearance, which in the midst of flowers and foliage would give them a peculiar value they cannot possibly have in their present isolated position.

The name of the exhibitor whose contribution next demands attention is one which every lover of art or art-manufacture must reverence, and it is something to have it represented on an occasion like the present. We allude to Messrs. Wedgewood and Sons, of Etruria. The exposition here made in many of those departments in which Josiah Wedgewood (6) excelled, and for the perfecting of which he secured the services of Flaxman and those of a body of artists capable of carrying out in an intelligent manner the views of the great sculptor, is far more satisfactory than we expected; for we have here the blue jasper vases, and cameos with white bas-reliefs from the antique, in all their excellence, and a copy of the Barberini, or Portland Vase. These, with specimens of Queen's ware, the chessmen by Flaxman, and efforts in "Carrara porcelain statuary," or Parian, all show that the old spirit is "not dead but sleeping," and that the Great Exhibition has awakened those energies and aspirations which have been so long slumbering; for we find here examples which have been suffered to almost sink into oblivion from sheer neglect and apathy, and yet how well they look in the broad daylight of the Crystal Palace. The specimens of black ware, or jet, are very excellent, and the red terra cotta with black figures are complete revivals of the olden type. Nor must the chemical vessels be forgotten, since their quality is no mean test of the present skill of the house. In short, as a whole, whose who honour the name of Wedgewood may feel tolerably well satisfied with this proof of the vitality of the firm.

Messrs. S. Alcock and Co. (7), of Buralem, exhibit a high class of printed ware, of excellent quality; the plates being especially good, and the cups and saucers pretty in style and chaste in colour. The painted plates are, however, heavy in manner, and the flowers inartistic in execution. The specimens of Parian are extravagant in subject; the relief, as in the sportsman's jug, being too high for artistic effect. The "Cod-fish Cigar-ash Holder," by Alfred Crowquill, is very clever in its way, and some of the more classical of the Parian examples are pretty.

J. Clementson (8), of Shelton, has some excellent examples of printed ware, the landscape engravings being artistic and well-selected, according to the prevailing mode, which, of course, the manufacturer is obliged to follow. In addition to these, we have Parian examples again; and Messrs. T. J. and J. Mayer, of Longton (9), show this material, or bisque, wrought into such clever imitations of flowers as to be quite ridiculous, and to us it appears a sad waste of time and material. The toilet vessels exhibited by this firm are effective in decoration, and excellent in quality and colour. The rustic jugs, however, are more curious than artistic or beautiful. The specimens of colour-printing, as shown in labels for advertising, are effective, and susceptible of further development.

Messrs. Naigh and Sons, of Hanley (10), exhibit china in great variety, but of very unequal execution. The examples of two dinner services are rich and effective. Amongst their specimens of Parian, a bacchanalian vase is very clever in many points, some of the *relievi* being well modelled; a clock, too, in this material is very suggestive. The vases, with portraits of the Queen and Prince Albert, with views of the exterior and interior of the Crystal Palace, are clumsy in outline. The stork, as suggestive of domesticity, might have been wrought out to a better purpose. Some of the other vases are very pretty and effective.

Messrs. T. and R. Boote, of Burslem, exhibit a Brobdignagian Portland vase of such dimensions as would almost bid defiance to any breaking propensity which might develope itself by any association of idea arising out of the attempted destruction of the original. The remainder of the contribution of this firm is of more useful articles, the best of which are some very excellent jugs for "toddy" or hot water.

Messrs. Pinder, Bourne, and Hope (15), of Burslem, make a pretty display, in which there are points of excellence; and Messrs. Anderson and Bettley (16), of Longton, show specimens of cups of pretty design, intended for Italy and the East. The white examples are very clear, and the decorations of the more elaborate ones elegant and effective. The examples of plates, too, are very good in ornamentation.

Messrs. F. and R. Pratt and Co. (22), of Fenton, make a rather remarkable display of examples in colour-printing, in which popular engravings are well given on a variety of articles, such as scent-jars, dessert pieces, &c. One large plate is decorated with an engraving in this style from Warren's picture of "Christ and his disciples in the corn-field on the Sabbath-day;" and it is certainly an admirable example of its class, the effect of the whole being very artistic. The imitations of the Etruscan vases in red and black are also worthy of notice, and the plain printed articles generally are of superior quality. Similar examples, exhibited by Messrs. Serjeant and Pepper (19), of Hanley, are also very good. One plate, with a vine border, is very excellent.

Messrs. Keys and Mountford (14) show a considerable collection of Parian examples, some of which are also exhibited by other houses, and others are only to be found here. They do not call for any special attention from us, though of interest to the visitor, or those who desire to see the extent to which the use of this material is now carried. The copy of the "Warwick vase," exhibited by Messrs. James Edwards and Son, of Dale Hall, Bruslem, is a prettier example.

We cannot conclude our notice of the contributions from the Staffordshire potteries, without calling attention to the very admirable display of door furniture in china, by Mr. W. S. Kennedy, of Burslem. Thus, we have finger-plates, door-handles, pateræ for bell-pulls, &c., many of them very excellent in design and execution, and of all styles and colours. Nor should a very cleverly reduced model of the classic bust usually known as "Clytie," executed in terra cotta, and exhibited by James Marsh (51), of Longport, be overlooked; and still less the wine-cooler, also in terra cotta, by the same youth, who is, we understand, a pupil of the Hanley School of Design, in which institution these works were executed. The latter example is clever in design, and the chimeræ are spiritedly modelled.

On the whole, this display is far superior to what might have been expected.

WORCESTER.

The exposition of the porcelain trade of Worcester is now confined to two houses, and the examples of Messrs. Chamberlain and Co. are by no means so novel as for the reputation of their city was to be desired. Excellent as many of the examples certainly are, still it would have been more satisfactory to have seen full and complete evidence of present operations, rather than so great a reliance on that which this house did years ago. As a whole, the display is an interesting one. The vases are generally good examples of their class; and the one on which the subject of "Cardinal Wolsey received at the Abbey Gates, Leicester," is displayed is a valuable specimen of the talent of one of the founders of this house, Mr. H. Chamberlain, and is handed down as an heirloom in the firm. The painting is a first-rate example of its class. In general the articles are over decorated, and the stippling carried to a painful extent. Some of the landscapes are pretty and effective. The "honeycomb" examples are very rich in effect, and the communion vessels are got up with great care; but, unfortunately, the subject-pieces with which they are decorated are badly drawn. The same may be said of the supporters to the arms upon the dinner-service executed for Lord Ward. The border, and, indeed, the effect of the whole, is very excellent, the blue being splendid in tone, and, but for the inaccuracy alluded to, the work would be almost perfect. Some of the less decorated articles are very elegant.

Messrs. G. Grainger and Co. exhibit specimens of their semi-porcelain, a new material, to which they have paid great attention, and with marked success. For chemical purposes it is of the greatest value, as it

resists the action of fire and acids. For general purposes its decoration is, of course, subject to the same laws as other materials; and in the examples before us, with much to satisfy, there is much to find fault with. The examples of tea-services are very pretty, and the less decorated of the plates are very excellent; the flowers, however, are generally very badly drawn, and the painting inartistic and wanting in relief. The Worcester manufacturers should attend to these points.

COALBROOK DALE.

Messrs. John Rose and Co. (47), of Coalport, make, on the whole, a very satisfactory display; but the remarks we have made as to the want of accurate artistic knowledge in carrying out details as seen in the Worcester china, are applicable in this case too. With an amount of labour of an almost fearful character, there is little real artistic result; yet no one can doubt the effort, and wonder that the same house which could carry out the very beautiful examples of a less ambitious character to be found in this collection, could have wrought out the other. Nothing can possibly be more satisfactory, or more magnificent in appearance, than some of the specimens of dinner services placed at the back of the case. Those in blue and gold are very beautiful. Then the Rose Du Barri service, to which we shall again allude, is everything in colour which the most fastidious could desire. Indeed, the colouring, generally, is excellent, except where, by overstippling, blackness has been the result. Some of the examples of tea services are very charming: and those with blue and gold interlaced ornament are perfect of their kind. The dessert pieces are, perhaps, in some cases, too much overloaded with detail.

In Parian, a great effort has been made by this house in getting up probably the largest group yet executed in this material. As already indicated we doubt the policy of attempting these large examples; and giving Messrs. Rose full credit for the attempt, cannot think it has been so successful in the casting as it deserved to be. The sentiment of the group which represents the "Pleïades adorning Night" is unexceptionable, and the treatment elegant. The large group of "Puck and his Companions" is fanciful, but too large. "The Wrestlers" is extremely well executed.

Messrs. A. B. and R. P. Daniel, of 129, New Bond-street, exhibit two dessert services made by Messrs. Rose and Co. Here we see the Rose du Barri in all its glory, the distinctive feature being its peculiar tint, which was first introduced at Sèvres in the reign of Louis XV., and named after his mistress. There is great beauty, softness, and richness of tone, the colour being at once very regular and semi-transparent. The effect is very beautiful. In Messrs. Daniel's case we find a very superb service in white and gold, which proves the capabilities of the manufacturer; and if we object to the decoration as being carried too far, it is because the knowledge where to leave off is a point to which the attention of our manufacturers requires to be directed. The parian ewer exhibited in this case is a mistake. Before quitting these examples we cannot but express our regret that both Messrs Rose and Messrs. Daniell should have marred their display by glass cases, which for this class of articles, and in such a light, appears very objectionable, as it shows their examples to a disadvantage.

LONDON.

Messrs. T. and M. S. Brown, 47, St. Martin's-lane, make a very pretty display. The printed examples are very good, but there is too much of the "shop" in mixing the china, &c. with glass. The method of showing the Portland Vase, which is so mounted that the design upon the bottom is seen, is very good. There are other exhibitors, to whom, had space permitted, we desired to call attention, but cannot do so now. We must not, however, fail to do justice to the very admirable display of patent ironstone china made by Mr. C. Mason, of Longton, and which ought to have been alluded to in connexion with the Staffordshire Potteries. If the Chinese type is the true one for this class of manufacture, then is Mr. Mason's exposition a perfect one, for it is sufficiently Chinese for the most fastidious of Celestials—vases, scent-jars, garden-seats, &c., in which dragons of sufficient ugliness, and gilding and colours of sufficient brightness, are all brought together in glorious but orderly confusion; and the whole group is one of interest to the admirers of this peculiar school of decoration.

We had intended to conclude these notices with some general comparisons between this display and that on the Foreign side, but must postpone them until our notice of the productions from the Continent.

THE CONTRIBUTIONS OF RUSSIA.

THE accident that has placed the produce of Russia next to that of the United States is curious and suggestive. The greatest empire next to the greatest republic—pure despotism side by side with perfect self-government, vigorous private enterprise compared with the results of Royal patronage; yet there are strong points of resemblance between the two countries. Barely 160 years have elapsed since Peter the Great, while commencing the task of Europeanising and civilising Russia, worked by day in the shipyards of Deptford, relaxed by driving a wheelbarrow through Evelyn's beautiful holly hedge at Sayes Court (a hedge still in existence), and sat up at night drinking brandy and pepper with the Marquis of Caermarthen. But sixty-eight years have passed away since Benjamin Franklin, dressed in the brown suit in which Wedderburne had abused him as a rebel, attended as Minister Plenipotentiary from the United States to sign the treaty of peace by which Great Britain acknowledged the independence of the Republic. Both have made rapid strides in that brief period. Both have invited immigration. The Russians on plan, rule, and system; the Americans by free liberty to labour and great chances of independence. Both have still huge tracts of land to be cultivated. Both are rich in raw produce and natural wealth. But the progress of Russia depends almost on one irresponsible man. The progress of the United States depends on the continued vigour of a nation which so far has proved itself equal to every opportunity. The Russian confides in his emperor; the "Statesman" depends on himself. The American people have made the United States the great nation it is. But no man of observation can doubt that it has been the hard hand of despotism which has raised the Russian empire from the condition of semi-barbarism in which it existed in the time of our William III.

The Russian exhibition consists of two compartments of a totally different character. In the North side of the Nave are to be found rich green malachite vases, the produce of the imperial manufactories. Some of these works are of extraordinary magnificence, particularly the green jasper or malachite doors, the chimney-piece and stove. There are also several gigantic vases of painted china made after the fashion of Sèvres, tapestry carpets of great magnificence, jewellery as splendid as gems can be made under the hands of a Parisian workman, particularly a box on which the natural colours of purple grapes, peaches, and other fruits have been imitated in precious stones. By the side of the jasper vases lie lumps of the raw material, some as large as a foot-ball. The whole of this collection, with which a few weapons of war are intermixed, composes a brilliant museum of what may be termed *Royal toys*, in contrast to the spades and axes which compose the *heavy steel toys* of Birmingham. They are not made for profit or the subject of any export trade. It is part of the Emperor's State, in the same way that he has tall horse-guards and footguards, to have certain imperial manufactories where porcelain, jasper vases, and tapestry carpets are manufactured, without regard to expense, either to adorn the imperial palaces or to be presented to his friends and allies.

On the same principle we find that the Emperor has lately sent young men to Rome, to become pupils of the most eminent artist in mosaic, with the view of founding a manufactory of mosaic in St. Petersburg.

It is understood that the porcelain manufactory is under the direction of Frenchmen; and although the Russians have shown great talent in making external copies of various works, they do not as yet much understand the meaning of honest workmanship in articles that require exactness of fit. Indeed, in St. Petersburg almost all work of fine art or taste is in the hands or under the direction of foreigners. The malachite vases are not, as they would at first sight appear, solid, but veneered, as it were, on copper. The expense of their construction is very much increased, when, as in the instance of the splendid specimens exhibited, it is determined to complete every wave and shade of the vein, for then it becomes almost as difficult a work as mosaic.

The malachite is found in the copper mines in which Russia is so rich; some of the finest specimens have been obtained on the property of the Prince Demidoff. It has also been found in considerable quantities in the Burra Burra mines of South Australia, and hence lately come into fashion for colonial brooches and bracelets.

Almost all the articles exhibited in this Northern Bay are the produce of a system, almost universal among the monarchies of Europe, of carrying on Royal or National manufactories, as a matter of luxury and as an example of taste. Such in France are the national manufactories of Gobelins tapestry, of Beauvais carpets, and Sèvres china; in Prussia, of iron-casting and porcelain; in Saxony, of porcelain; and in Tuscany, of mosaic in *pietra dura*. To several of these establishments, particularly in Russia, and in the Gobelins establishment in France, schools for instruction in drawing and painting as applied to manufactures are attached for the benefit and the due training of workmen. In England, it is with difficulty that money is obtained for schools of design; but although we wisely rely on private enterprise for manufacturing excellence, it would pay us to devote more money to cultivate taste.

Russian Carriages.—On leaving the splendid department dedicated to luxury and fine arts, we find in the small avenue to the north some more real and utilitarian specimens of Russian industry, in a set of very handsome carriages, of a peculiar national form. These are the Russian drosky, equally available on wheels, or in the winter on runners, and the favourite carriage of Russian gentlemen. They are on four wheels, very low, with a strong iron forked perch, and a double body, the first of which either holds one or two persons abreast. There are specimens of both kinds: the other merely holds a seat for the driver, who sits close upon his horse or horses; when a pair arr used, the correct thing is for a shaft-horse to trot, while the second, harnessed to an outrigger, gambols at a canter beside him.

It will be necessary to give an illustration in order to afford a correct idea of the shape of these vehicles. They are very stylish, but suited to a military nation. They allow of no lounging; the passenger must sit as upright as though he were driving himself in a dog-cart. It is not considered correct for ladies to be seen in them in large towns, but of course they are occasionally used in the country. With a little lowering of the seat, they might be copied with advantage here, and would prove a pretty novelty. The workmanship deserves unqualified praise, except the shafts, which are heavy and clumsy. The leather splash-boards round the wheels are particularly well arranged—no stitching appears, and they look like pieces of solid japan; the lining and the varnishing are equally well finished. If the wood is sound and well seasoned, they are not dear at the price set upon them—£47. A set of harness hangs up in the large room, which is also of a fashion peculiar to Russia. We should recommend the obliging Russian Commissioner to procure a wooden horse, so as to exhibit one of the turn-outs complete. It is difficult to explain, to those who have never seen them in use, the arrangement of a great birchwood bow, which is an indispensable ornament of Russian harness, and from which bells are suspended over the horse's neck. Close to the carriages are a pair of very light sledges of iron; these harnessed to horses are used for running races on the ice of the Neva in winter, and awful cockleshells they seem to go any pace. The driver sits on a low bench with no support to his back. Steeple-chasing must be child's play compared with such sport.

Crossing the main avenue to the South Bay we enter the compartment in which the staples which constitute the export trade of Russia, with several curiosities, are arranged. These are important almost in proportion as they are unattractive: one part of the walls is hung with leather, including choice specimens of the "Russia" dear to book collectors. On the counter, with many pairs of boots and shoes, requiring no particular notice, being neither better nor worse than French, German, or English, are a pair of dress-boots, made of the thinnest and best calf leather we ever remember to have seen. It is as soft and flexible as kid, but stronger. We are informed that the material is much used in Russia for full dress boots. If it can be delivered here at a reasonable price, a large demand is certain. All the leather exhibited is well tanned, soft, and a good colour.

Russian Felting.—On the same counter as the leather are a number of stockings, shoes, and other articles made of felt by the Russian peasantry. A very curious manufacture indeed, well worth the examination of the trade. Each article seems felted separately, and made solid yet soft. The shoes are regular sabots, two inches to three inches thick in the sole, apparently moulded on a last, strong enough to resist the cut of a sword or even a bullet, and yet soft and warm inside. For travelling in winter they are invaluable. But this mode of felting is evidently adaptable to many other purposes. On the opposite table are basins, jugs, cups, helmets of the same material japanned inside and out. They are light, tough, and not to be broken. A washhand jug and basin are rather dear (17s.), but they would be famous articles for sea voyages. Gutta percha has been tried for that purpose, but it melts in tropical climates. We advise our outfitters to look to this.

Provisions.—A trophy of sheafs of seed-bearing agricultural produce, very elegantly arranged, containing every kind of wheat, barley, oats, rye, buckwheat, flax, hemp, peas, and beans grown in the Russian dominions, occupies the centre of a counter, round which are arranged in bowls the seed and flour of these articles. Among them our cooks may find it worth while to try a small kind of dried pea for winter use, in soups, of a very sweet taste. On the walls around are specimens of the famous Russian hemps, raw and manufactured, with canvass and ropes and twine, which, with grain and tallow, are too well known to our merchants for this last hundred years to need further notice.

Dried Provisions.—In the same department is an extensive collection of dried provisions, including *caviare*, dried sturgeon, isinglass, a substance resembling isinglass made up in the shape of a rude whip which is obtained from a fish called the *Vesiga*, and used in Russia to make pies; but, perhaps, the article most likely to become a new staple of commerce is the *glaze*, now imported, as we are informed, for the first time. This article, so much used in this country for making sauces and soups in clubs, hotels, and great houses, is obtained in Russia by boiling down the flesh of horned cattle, which, on the plains of the interior, are only valuable for their hides and tallow. Anything that can be made out of concentrated meat or glaze is so much additional profit. But it is an operation which requires care—a little burning will spoil the whole boiling. Liebig gives directions for the operation in his last work: as commonly conducted, the product affords very little nourishment.

Iron and Steel.—In the avenue behind the bay just described, the specimens of iron and copper, in ore and in a manufactured state, are displayed. The iron, some of which is of a very fine quality, is a matter of interest to us, because Russia, in conjunction with Spain and Sweden, supplied most of the iron consumed in this country for more than 100 years, between the time that the timber for charcoal in Surrey, Sussex, Kent, Staffordshire, and Worcestershire, was exhausted, and the successful application of coal to smelting iron, by Abraham Darby, at the Colebrook Dale works, in 1713, and the application of the use of blowing cylinders, instead of bellows, at the Carron Works, set up by Smeaton in 1760.

Our connexion with the Russian iron is of very ancient date. In 1569 the English obtained by treaty the right of seeking for and smelting iron ore, on condition that they should teach the Russians the art of smelting this metal, and pay, on the exportation of every pound, one halfpenny.

Every branch of mining received great development under Peter the Great, who seems to have neglected no branch of material prosperity. It was under his reign and direct patronage that the Demidoff family rose to importance as miners, and obtained the property which has rendered them ever since one of the wealthiest families in Europe. Up to 1784, Great Britain imported a continually increasing quantity of iron from Russia, which in that year amounted to forty thousand tons; after that period, in consequence of improvements in machinery for smelting by coal, the importation gradually declined to about five thousand tons in 1805, and continued at that figure up to 1837, and, probably, is about the same now, being all of one quality in the trade, called C. C. N. D. old sable iron, which is used for the manufacture of steel.

Fire-Arms.—The fire-arms and white-arms exhibited have all been made at one of the four Crown manufactories, where the work is done under the inspection of Government officers, by serfs of the Crown. The oldest manufactory is at Tula, where, besides muskets and side-arms, the iron-work of horse harness, iron bedsteads, files, chains, &c., are made. This establishment was burnt in 1834, according to the rumour of the day, by the workmen, who hoped to get rid of the forced labour imposed on them by the ceaseless wars of the Emperor in Turkey, Persia, and the Caucasus. Under the Russian Royal Factory System, increased work does not give increased wages. But the Tula establishment was rebuilt.

In the North Gallery, the Emperor exhibits, with other furs, a black cloak made from the neck of the silver fox, which he has valued at £3500: this valuation has brought out a letter from Mr. Nicholay, the well-known furrier, who offers to make a finer cloak for £1000, and explains that black and silver fox skins, so much valued in Russia, and so little used here, are chiefly imported into London from the territories of the Hudson's Bay Company, and then purchased up for the express purpose of "being smuggled into Russia as occasion may offer."

What a commentary on the Russian protective system!

In the back of the same case as the furs are two splendid specimens of twilled shawls, by a Cossack woman, from white goats' hair, of wonderful fineness. One of these shawls is the property of the Empress, and justly valued at the price of Brussels lace.

Russian manufactures are for the most part inferior and dear, while mineral, and vege table, and animal produce could be supplied in unlimited quantities at a profit, if roads were made and facilities given to trade. But Russia is essentially a military country, prepared to take advantage of events, and probably the Emperor considers that a large trade might produce inconveniently pacific tendencies in his landowning nobles.

In conclusion, we consider this a very attractive but imperfect representation of the vast resources of Russia.

ENTERTAINMENT AT LIVERPOOL IN HONOUR OF THE GREAT EXHIBITION.

ANOTHER visit paid by the celebrities of the Exhibition to one of our great provincial towns took place on Saturday, the 12th instant. Only recently we gave an account of a reception at Birmingham to the distinguished men connected with the Exhibition, and which, though unattended by any pomp or pretentious ceremonial, was full of a deep significance and interest to all who shared in it. Birmingham, the first town to originate a local exhibition of its own, was appropriately first in the field to welcome the chief actors in the World's Fair down into the provinces. After Birmingham, Liverpool put in her claim to be visited, but in a style peculiar and characteristic. The invitation is given by her leading merchant, the member for the southern division of the county. He undertook to do the honours of the occasion himself—thus forming an example, even in hospitable guise, of the private enterprise, united with public spirit, which have combined to make the place what it is. Again, visitors were not asked to go a long journey in order to see different ingenious processes of manufacture. In harmony with the greatness of Liverpool, they were to examine its miles of docks and warehouses—to appreciate by actual inspection the extent of its mercantile marine—to realize the enormous importations of raw produce and the equally vast exports of manufactured goods. They were to have an opportunity of perceiving how great are the advantages of system and order—how a large expenditure in public works, which secures these, is a wise economy in the end. Finally, they were to dine with their host on board one of the great Transatlantic steamers, herself a world of wonders complete—a great exhibition afloat; as this ship was American built and owned, it was only natural that the occasion should be seized on for illustrating the strong practical ties of commerce, superior to prejudice, which, mainly through this port of Liverpool, bind together the parent state and its vigorous and independent offspring.

The invited guests found their way down to Liverpool as best they could, the foreigners getting passes and the natives paying their fares as usual. At 10 o'clock on Saturday morning they all assembled at St. George's Dock landing wharf, where they embarked on board a river boat, and, under the guidance of Mr. Brown, who received them there, proceeded to view the steam-ship *America*, then with her steam up and waiting for the mail bags to start for New York. The spacious quarter-deck, the cabin accommodation, the machinery, and the stores of this fine vessel, were all attentively examined. The Alderney cow to supply milk, the poultry, the joints of meat enveloped in masses of Wenham Lake ice—these, and a hundred other objects, were carefully noticed. Nor did the complement of passengers, so thoroughly American in their *physique*, fail to attract attention. At length the mail bags were all received, the noble ship started on her way, and, with a parting salute and cheer, Mr. Brown and his friends left her to pursue her voyage. The strangers then betook themselves to the Birkenhead side of the river, where they landed and strolled about for some time, viewing with interest that remarkable example of overbuilding and those indications of future greatness and prosperity with which Birkenhead abounds. From this place, and the natural train of thought associated with it, Mr. Brown conducted his guests to the *Atlantic* steamer, anchored in the Mersey, and now once more ready for service, having had the recent accident to her machinery completely repaired. As they went on board they were received by the commander, Captain West, who courteously showed them every part of the ship worth seeing. The *Atlantic* is fitted up with a splendour which is truly astonishing; and one feels quite at a loss whether most to admire the great sweep of her quarter-deck, the magnificence with which her state-rooms and berths are equipped, or the cyclopean dimensions of her engines. After completing their survey of her, the company returned to the Liverpool side of the river, and, led by Lord Granville and Mr. Greville, made their way to the new Albert Dock, the various striking improvements in the construction of which were fully explained to them. Of these perhaps the most remarkable is the application of the hydraulic press power by Armstrong's patent in such a manner as to secure the complete action of cranes, ascending platforms, and other machinery used in docks, at any point, however distant from the press, and by means so simple that the strength of a child can completely control them. There is a small working model of this beautiful invention in the Crystal Palace, which at once indicates its great utility. The extent and contents of the bonded warehouses seemed particularly to astonish the foreigners, who, on entering one room filled with nothing but tea-boxes, and on asking a few very simple questions, were told that the number of boxes was 20,000, the quantity less than usual, and about a week's consumption for the whole country! They also appeared a good deal surprised at a range of warehouses filled with raw cotton, and considerably longer than the Crystal Palace. The Custom House was afterwards visited, and, lastly, St. George's Hall, a new building now in process of construction, where justice is to be administered, balls to be held, and concerts to be given.

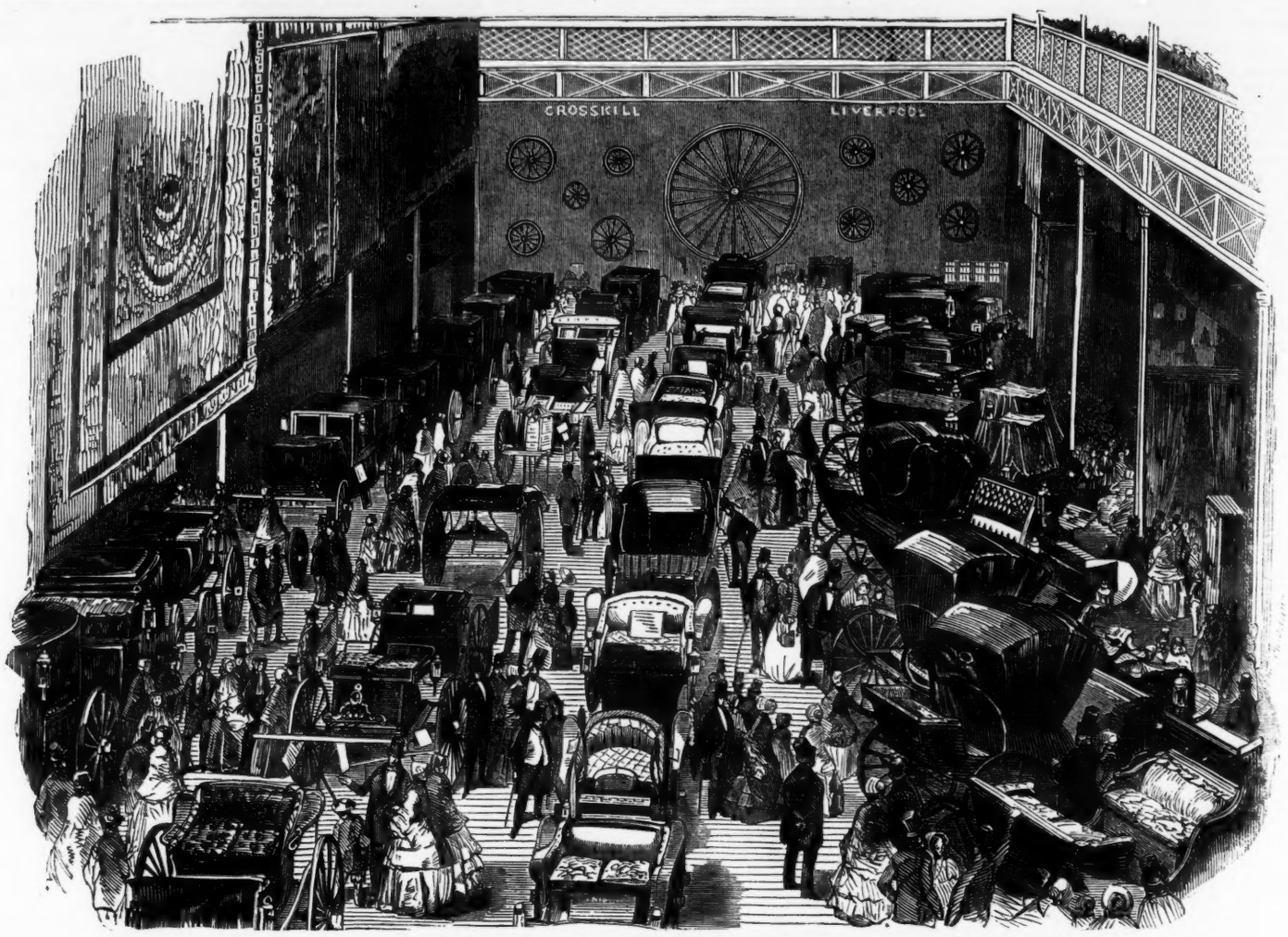
Four o'clock had now arrived, and with it the period fixed for again taking to the water and going on board the *Atlantic* to dine. There Mr. Brown had caused to be prepared a magnificent entertainment, at which, notwithstanding some important omissions, arising from the shuffling and unhandsome behaviour of the North-Western Railway Company, there was nevertheless a large and highly distinguished and influential company assembled. When dinner had terminated,

Mr. Brown gave the "Health of her Majesty, as Duchess of Lancaster," which of course was responded to with great loyalty.

"His Royal Highness Prince Albert, and the rest of the Royal Family," were next toasted; after which, the "President of the United States" was proposed, and Mr. Davis acknowledged the toast.

Mr. Brown then gave the "Health of the Royal Commissioners."

Earl Granville, whose name was associated with the toast, acknowledged the compliment paid to that body. There was at the Exhibition, he said, a model of the docks of Liverpool, to which excessive interest attached, even more than by some was anticipated, and it was daily surrounded by crowds who had never had an oportunity of seeing Liverpool itself. He felt grateful to Mr. Brown that he had not been satisfied with the imperfect notions which models give—and that he, one of the merchant princes, in the true sense of the word, who had brought Liverpool to what it now was, who had enriched it by their commercial enterprise and their ability which they had an opportunity of seeing, who had benefitted it by their attention to the liberal sciences, and sanctified it by magnificent charitable institutions—he was grateful that Mr. Brown had, in that splendid entertainment, given their distinguished foreign guests an opportunity of seeing a town, of which he and his fellow-citizens might so well be proud. If there is a point that could add satisfaction, it was, in giving this reception, it took place in one of the Transatlantic steamers, and under the American flag. With the most sincere pleasure he acknowledged the propriety, in Liverpool, of their meeting on what might be termed American ground, and thereby strengthening the feelings of friendship which existed between the United States and this country. There was in the Exhibition, besides the model to which he referred, a collection of raw material, made by Mr. Archer, for the instruction of merchants, and curious as representing the number of raw materials sent to this port from every country in the globe. To-day they had seen the ships which brought that produce, and the magnificence of the docks in which they were stored. But what he wished to impress on their attention, and on that of the foreign guests, was the proof thus afforded how much the prosperity of Liverpool and this country depends on the welfare of those countries which these gentlemen represent. (Loud



THE CARRIAGE DEPARTMENT.—FROM A DAGUERREOTYPE BY CLAUDET.—(SEE NEXT PAGE.)

cheers.) He thought they would feel that it was no empty wish on the part of the people of this country, to hope for the future prosperity, for the order, the liberty, and the commercial improvement of all foreign nations. (Cheers.) And when that wish was pronounced, though founded on feelings of self-interest, it was combined with other and higher sentiments—(Cheers)—sentiments which had received a great impulse from the cordial manner and goodwill foreigners of all countries had shown in co-operation with the objects of the Exhibition. (Cheers.)

"The Executive Committee," "The Mayors of South Lancashire," "The healths of Mr. Paxton and Mr. Fox," were amongst the toasts which followed.

Dr. Herman responded to the toast of the "Jurors," in German. He expressed his confidence in the impartiality with which their awards would be made, and said that he had recognised in their proceedings and action hitherto some of the principles which constituted the greatness of England. It was to the concentration of the mind on one point that she had acquired possessions in every part of the world; and in the same way she fulfilled her mission in spreading civilisation to the remotest nations. The impression of the working of this great principle was not lost on those foreigners who had been witnesses of it. The consequences of the Great Exhibition would not be merely commercial, but would also be found in the general influence of her great example in working and acting. (Cheers.)

A series of sentiments were then proposed by Mr. Brown, and were most cordially received by the company. The first of these was, "Success to the undertakings of all men of letters and science, engineers, and mechanics, whose heads and whose hands have added considerably to the social comforts of mankind."

To this succeeded the toast of "Peaceful Commerce—may it ever flourish, to carry religion and civilisation into the remotest corners of the world."

The next toast was, "The Armies and the Navies of the great nations of the earth—may they ever meet as friends, and not as foes, to co-operate for some great public good."

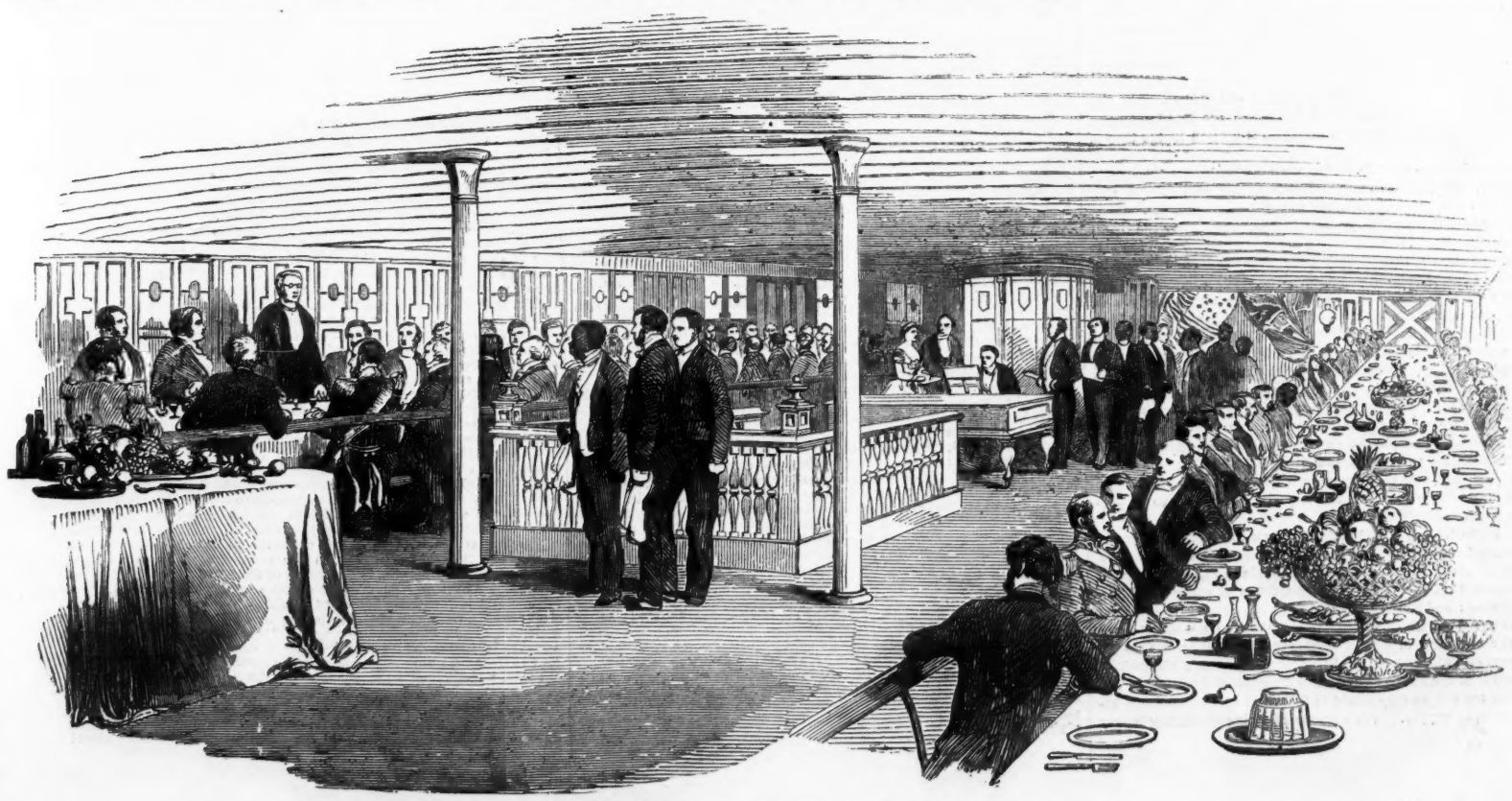
The next toast was, "The World's Commercial Fleet—may it continue to navigate the ocean, free from war's alarms, and add to the prosperity, the happiness, and the comforts of the whole human race."

Captain West, in brief, sailor-like style, returned thanks for his health being proposed, in acknowledgment of the courtesy with which he had received the company on board his ship.

Earl Granville then rose, and asked the company to drink to the health of their host, which, of course, they did very enthusiastically.

Mr. Brown, in returning thanks, assured his guests that it was a source of great satisfaction to him to meet so many distinguished individuals who had visited the Crystal Palace, or rather he would call it the Palace of Peace, by the contents of which the nations of the earth would learn to appreciate each others work. (Cheers.) His only regret that day was the shortness of the notice, which circumstances had rendered unavoidable. He had been deprived of the gratification of receiving many guests whom it would have given him great pleasure to see present. (Cheers.) It would, no doubt, be gratifying to those gentlemen who had honoured him with their company, to be informed how rapidly the important seaport town of Liverpool had risen into its present position, and he would therefore briefly trace its history. In the reign of Charles II. they had but 15 boats at this port, the tonnage of which amounted to 2560. In the reign of Queen Anne these vessels had increased to 170. He thought they had seen enough that day to form an opinion as to the present number. In 1756 their dock dues only amounted to £2200; in 1801 they had increased to £28,000; and last year they were £230,000. Their docks now covered an area of between 200 and 300 acres, and had cost in their creation no less a sum than £10,000,000. The population of the whole county in 1700 was 170,000, and at present it was upwards of 200,000: but the increase in the inhabitants of the town itself had been still more remarkable, having been in 1700 only 6000; in 1801 it was 78,000; and in 1851, upwards of 400,000. In 1760 it took four days to go by coach from Liverpool to London; now they were enabled to reach the metropolis in six hours; while by those splendid vessels, one of which they were then on board of, they could travel from Liverpool to New York in nine or ten days. (Cheers.) It was a most gratifying thing to him, that America, the offspring of their own nation, was now her firmest friend and best customer; and he trusted that the day would never arise when the good feeling existing between them would be disturbed. (Cheers.) He wished to impress upon foreigners, that it was their interest to give to this country whatever was of least value to themselves, but most valuable to us; while Englishmen would give them in return whatever was least valuable to themselves, but of most value to their friends. (Cheers.) Mr. Brown sat down, again thanking the company for the honour they had that day conferred on him by accepting his hospitality.

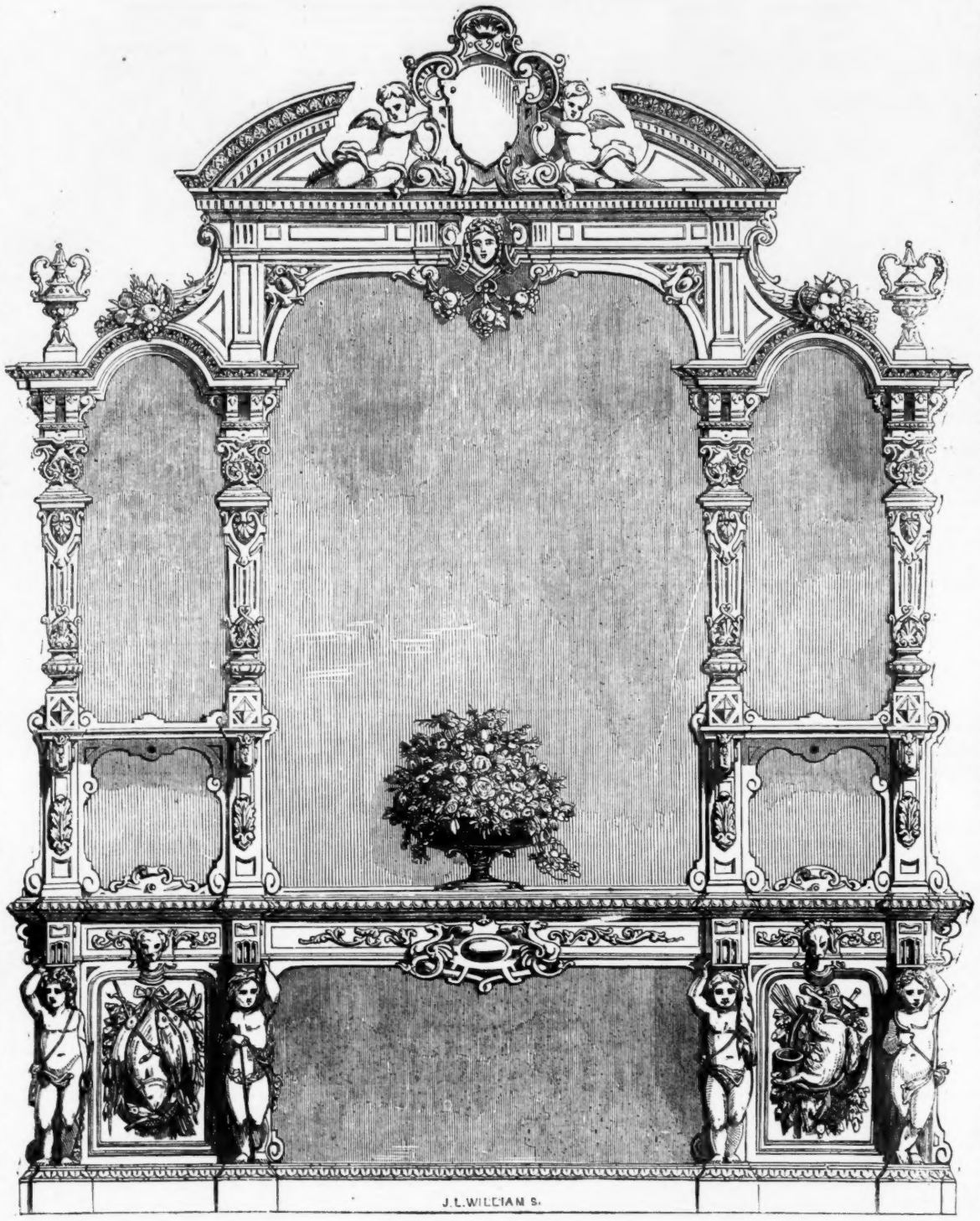
This terminated the festivities on board the *Atlantic*, but they were resumed and continued to a late hour at the Town Hall, the fine suite of rooms in which were thrown open to from 1200 to 1500 gentlemen, comprising all the influence, respectability, and wealth of Liverpool. The Mayor, though the chief duties of receiving the strangers devolved upon Mr. Brown, welcomed them with great hospitality, and the foreigners especially appeared immensely gratified with the cordiality of their reception.



ENTERTAINMENT IN HONOUR OF THE GREAT EXHIBITION ON BOARD THE "ATLANTIC," AT LIVERPOOL.

THE CARRIAGE DEPARTMENT.

THE Carriage Department, which is included in Class 5—that of "Machines for Direct Use"—is not without its wonders and its attractions for the whole locomotive community, from those who "ride in chaises" of their own, to those who take their fourpenny-worth in a "bus," or make their last journey in a hearse. And all may be here provided. The contributions are abundant, coming from every part of the United Kingdom: Dublin, Edinburgh, Southampton, Birmingham, Bath, Bristol, Worcester, Hastings, Greenwich, have each their display, of some sort or another. Long-acre and Bond-street, of course, have the largest, and perhaps the stateliest show; but Dublin and Southampton are not far behind. We shall defer our general review of the contents of this department till a future occasion; meantime, we shall only notice one or two contrivances which attracted us by their novelty upon our first flying visit. The supply of cars and dog-carts struck us particularly, for their novelty in structure in many cases, and generally for their extremely dashing appearance. Anderson, of Elgin, sends a Victoria car, a two-wheeled vehicle, seated for four, and convertible into a two-seated gig or car by a single turn of the key. Cousins, of Oxford, also, has a somewhat similar contrivance, or two-wheeled sporting carriage, adaptable, by means of a concealed screw, for either two or four persons. Kesterton, of Long-acre, has an "Amempton" carriage, a close, double-seated carriage of novel design, which, by a very simple contrivance, may be converted into a light, open barouche, being thus adapted either for summer or winter. These and other similar contrivances for making two descriptions of vehicle out of one, are certainly very ingenious; though, practically, we must say we question their advantages. Certainly, as far as solidity and lasting quality go, we prefer a simple, single-purposed vehicle. Baskcomb, of Chislehurst, has a "model carriage," which, amongst other merits, presents that of a contrivance for indicating the distance of ground travelled over. This, when it is carried successfully into effect, as it must one day be, will be a very important point gained, not only as regards hired vehicles, but private carriages, the owners of which, for the sake of their horses, are always interested in knowing how much ground has been gone over in the course of the day by the servants or others entrusted with the vehicle for the time being. Willoughby, of John-street, has a very completely equipped carriage for invalids, whereby they may be removed from their beds without any change of posture. An interesting wax lady, with rather blooming cheeks and remarkably neat cap, occupies this vehicle, being occasionally drawn forth amidst the breathless admiration of bystanders. The undertaker-general, Shillibeer, has a very spruce patent funeral carriage, "expanding and contracting at pleasure;" so that single gentlemen and family parties may be accommodated at a moment's notice. Model omnibuses of gorgeous colouring, and unlimited resources, are sent in in competition by various makers, and we hope some of them will be tried in place of the rusty, uneasy-going rattle-traps which ply upon many of the roads contiguous to the Great Exhibition, to the great astonishment and discomfort of the bones of her Majesty's liege subjects.



SIDEBOARD.—BY JACKSON AND GRAHAM.

ORNAMENTED MARBLE TABLE. BRIGHT.

This table is manufactured in Derbyshire black marble, ornamented with flowers in various-coloured stones, serpentine, lapis lazuli, &c., by Selim Bright, of Buxton, in Derbyshire. The design and execution are alike creditable; the workmanship being most minute and intricate—some of the flowers, we understand, containing many hundreds of separate pieces of stone.

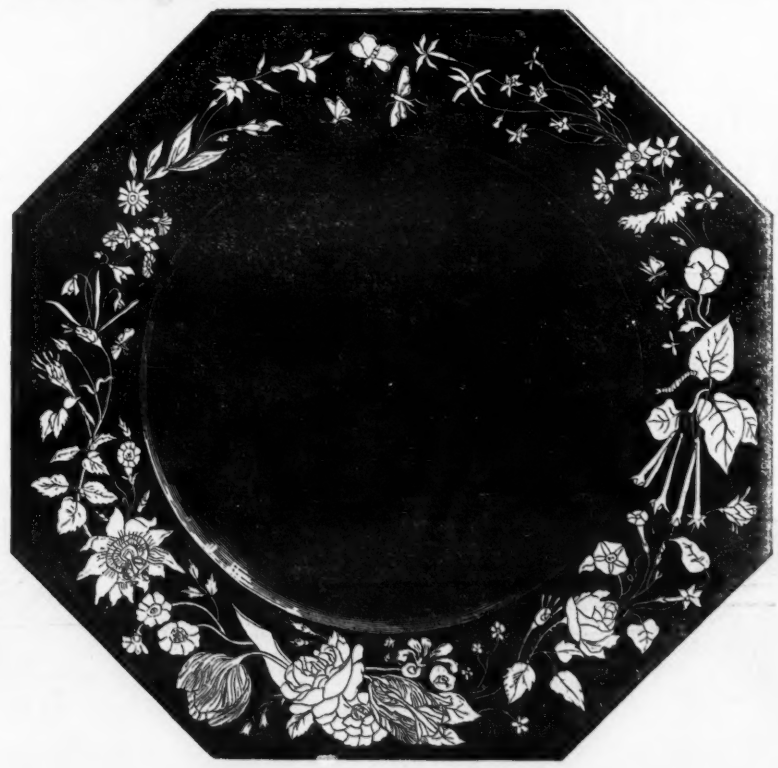
MOSAIC TABLE-TOP. BARBERI.

In our Supplement for the 12th of June we gave an article explanatory of the construction of mosaic pictures, with particular reference to the school of the Vatican, which may be considered the fountain-head of the art. In our present sheet we engrave a very beautiful table-top by Barberi, of Rome, the border of which contains a variety of views of public buildings, and other celebrated spots in Italy. The patient industry, ingenuity, and taste displayed in the production of these works are truly wonderful; and, what is more, the beauty of the result is fully commensurate with the labour bestowed.

SIDEBOARD. BY JACKSON AND GRAHAM.

This is a very substantial and handsome production, upon which an immense amount of inventional taste, and manual labour in the carving, have obviously been bestowed. The ornamentation is rich in the highest degree, and almost to be styled ambitious; but the general arrangement is so chaste, and the harmony and repose resulting from the adoption of a single description of wood—British oak—so complete, that the eye is by no means fatigued, nor the attention unduly taxed by details. The upper part is generally after the styles of Elizabeth and Francis I. Within the columns are handsome mirrors. The sideboard is supported by four little boys, of whom the two at the extreme ends are emblematic of wine and bread respectively, whilst the two on the inside stand as the representatives of fishing and hunting. On the panels are groups of fish and game, and other appropriate subjects, carved with remarkable boldness and exquisite finish.

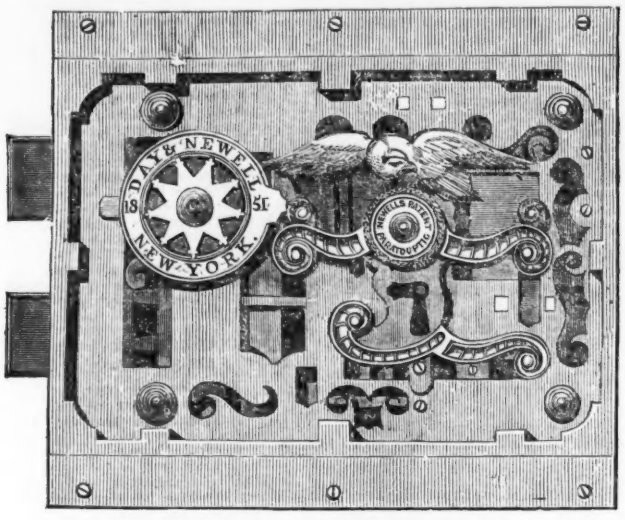
MOSAIC TABLE-TOP.—BY BARBERI.



ORNAMENTED MARBLE TABLE.—BY BRIGHT.

NEWELL'S PATENT PARATOUPTIC BANK LOCK.

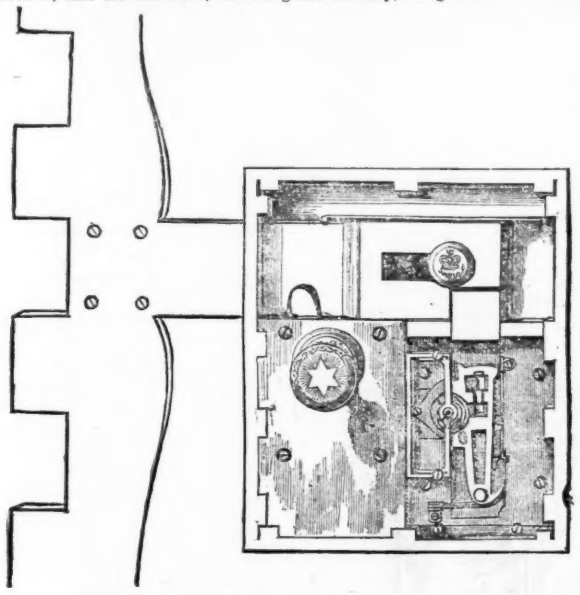
Few things in the department of the United States have attracted more attention than the safety lock of Newell, both from its own merits, and the great controversy now going on about locks, in consequence of the feats of lock picking performed by Mr. Hobbs, the agent of Messrs. Newell,



DAY AND NEWELL'S PATENT AMERICAN LOCK.

and other ingenious Americans. Of this controversy, and their ability to pick those hitherto considered perfectly safe in this country, we shall at present offer no opinion, as the matter is under the consideration of the Society of Arts, and will be properly investigated by them.

That Mr. Newell's lock is one of very ingenious and beautiful construction, there can be no doubt; and, as he deserves, he has received medals from some public institutions and scientific bodies in America and Europe on account of it. The most important feature in the Newell lock is, that the owner can, with the greatest facility, change the interior arrangement to a new and more complex one at any moment he pleases, simply by altering the arrangement of the bits in the key; and this is accomplished without removing the lock, or any part of it, from its position on the door. Its operation is as follows:—At the closing or locking of the lock, whilst the bolt is projecting, the moveable combination parts assume precisely the position prescribed to them by the key, according to the particular arrangement of its bits at the time the key is turned. The combination parts do not consist in one set of tumblers only, such as are found in most other locks, but there are three distinct sets or component parts, fitting into each other. When the bolt is projected, it dissolves the mutual connection of the constituent pieces, and carries along with it such as are designedly attached to it, and which assume the particular positions given them by the key in its revolution. These parts are rendered permanent in their given form by means of a lever adapted for the purpose, while the parts not united with the bolt are pressed down by their springs to their original places. If now the bolt is to be returned again—in other words, if the lock is to be unlocked—the constituent pieces or tumblers, which are in the original state, must, by means of the key, be again raised into that position in which they were when the lock was closed; otherwise, the constituent parts attached to the bolt would not lock in with the former, and the bolt could not be returned. Nothing, therefore, but the precise key which had locked the lock can effect the object. This lock is said to have another peculiar feature, one of considerable value, that it will withstand the action of gunpowder.



CHUBB'S BANKERS' SAFE-LOCK.

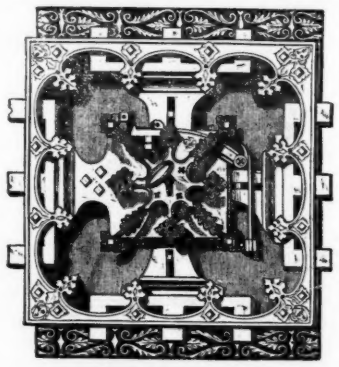
CHUBB'S LOCKS AND SAFES.

The articles sent for exhibition by Messrs. Chubb, comprise specimens of their patent detecter locks and latches for various purposes. Each lock consists of six distinct tumblers (except in the very smallest sizes), working on a centre pin; all of which require lifting to various heights by the key before the lock can be opened or shut; and not until each tumbler is lifted to its proper position, can the stud, which forms a part of the bolt, pass through the slots in the tumblers. A "detector," forming the great and peculiar feature of Chubb's lock, is added; and, in the event of either of the six tumblers being overlifted, in an attempt to open it by a false key or picklock, one of them is caught by a detecting spring in such a manner as to render it impossible to open the lock on the application of its own key. Notice is thus given of the attempt, and the lock may be set right by turning its key in a contrary direction, as in locking.

In design the locks are of various styles, Norman, Gothic, Elizabethan, &c., with appropriate steel and or moulu mountings, and ornamented keys, suited for ecclesiastical buildings and other purposes.

The patent quadruple lock for a banker's strong room door, consists of a combination of four separate and distinct locks in one, all being acted upon at the same time by a single key with four bits. For further security, there is a check lock in addition, throwing a hard steel plate over the large keyhole. The patent rim lock contains eighteen tumblers, with three different detectors, each acted on by six of the tumblers, and has been constructed to show the principle of Chubb's three different patents, dated 1824, 1833, and 1847.

The patent fireproof bankers' safe is made of wrought iron, the iron of the body being ½ inch thick at the thinnest part, and the doors 1 inch thick, the whole being lined throughout with hard steel plates to prevent drilling. To render the safe fireproof, it is lined with two separate and distinct chambers, 6 inches thick, filled with dried non-conductors of heat. The interior is fitted up with drawers, cupboards, &c., in a manner suited to bankers' or merchants' use. The folding-doors are secured by two patent detecter wheel locks, throwing twenty-eight bolts out all round, and are further fitted with case-hardened iron scutcheon locks over the keyholes of the principal locks. Its dimensions are 6 feet 6 inches high, 4 feet wide, and 3 feet deep, and its weight is 3 tons 5 cwt.



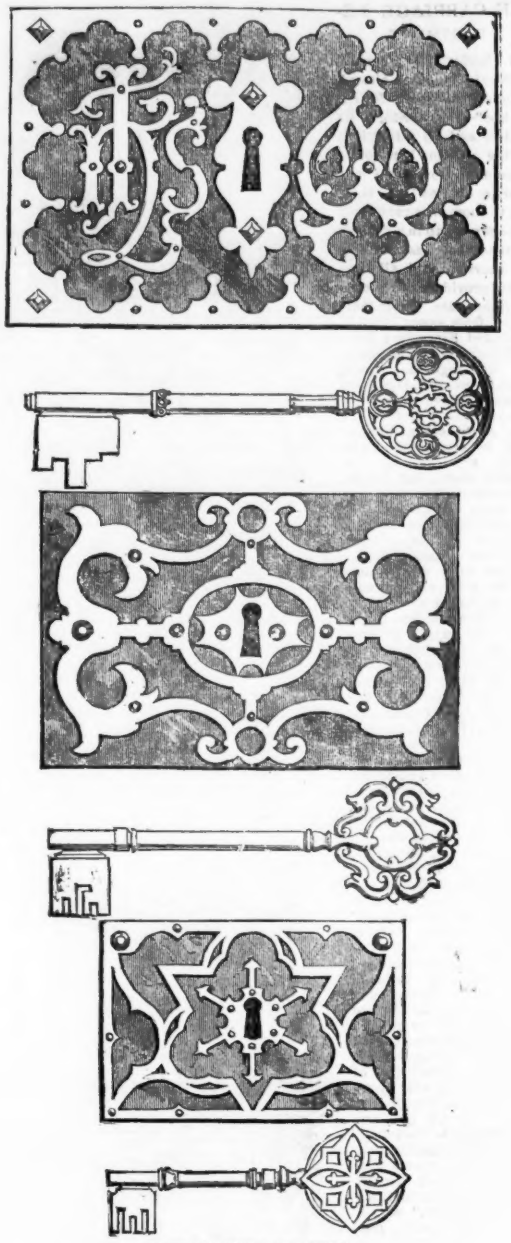
CHUBB'S LOCK (INTERIOR).

Messrs. Chubb also exhibit a model of their patent well safe, by means of which a safe containing any valuable property can be lowered to any distance below the surface of the ground, and secured by a fireproof door and framework at the mouth of the well.

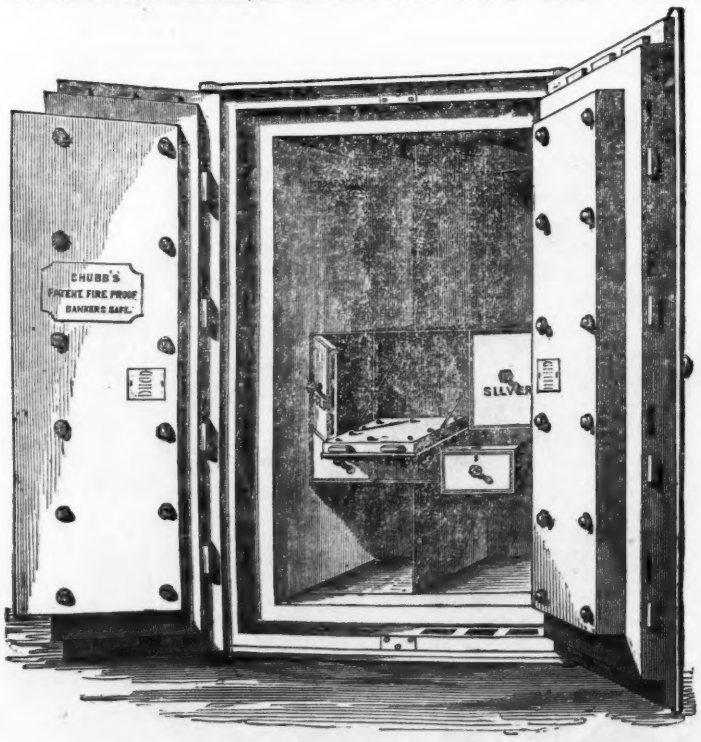
FAIRBAIRN'S PATENT RIVETING MACHINE.

This is a machine lately invented and brought into use by the Messrs. Fairbairn, of Manchester, for riveting the seams of boilers, &c. It owes its origin, we believe, to a turn-out of the boiler-makers in the employ of the exhibitor, about fifteen years ago. The principal advantage attributed to it is that it does noiselessly, at once, and with unerring precision, by simple compression, that which was formerly done by means of repeated blows of a hammer; and that before the rivet has lost its heat, so that by its contraction in cooling it grips the plates still tighter together. This machine is capable of fixing in the firmest manner eight rivets, three-quarter inch diameter, in a minute, with the attendance of two men and two boys to the plates and rivets; whereas the average work that can be done by two riveters, with one "holder-on" and a boy, is forty similar rivets per hour—the increase in quantity of work done by the machine being at the rate of twelve to one, exclusive of the saving of one man's labour. The work, also, is done better, for reasons already stated, the boilers being more secure from leakage than under the old method.

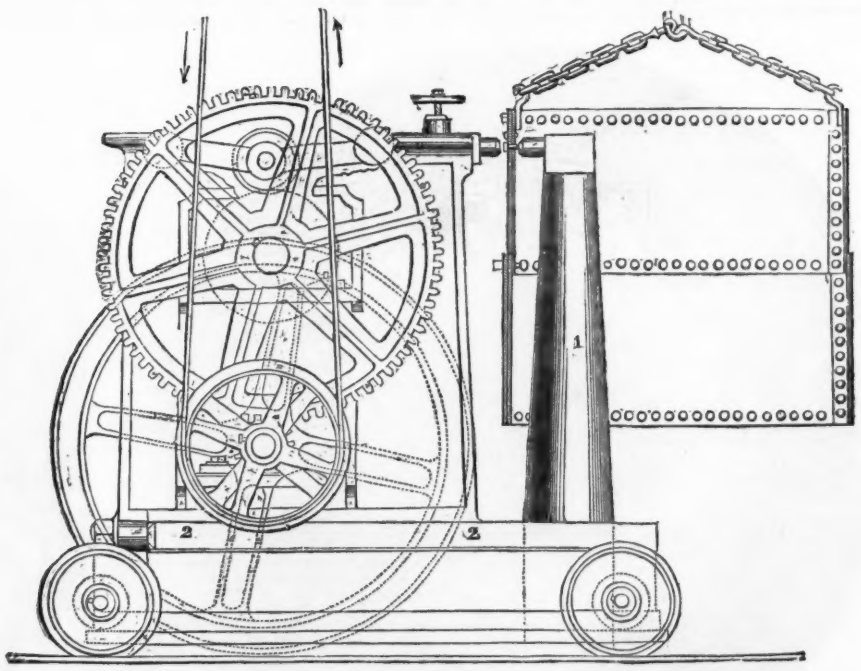
The construction of this machine will be easily understood, by those conversant with mechanical and engineering contrivances, from an inspection of the Engraving. The large upright stem is made of malleable iron. The riveting dies are of various descriptions, adapted to every description of flat or circular work; even the corners are rivetted with the same care as other parts, so that vessels of any shape may be completed without recourse to the old process of hammering.



CHUBB'S LOCKS AND KEYS.



CHUBB'S FIREPROOF SAFE.



MESSRS. FAIRBAIRN'S PATENT RIVETING MACHINE.

THE CHEMISTRY OF THE GREAT EXHIBITION.

HOWEVER desirable in theory an absolutely perfect classification of a museum may be, those who have been engaged in the arrangement of productions well know that the desideratum has never yet been attained. Very wisely, we think, did the Commissioners of the Exhibition agree, that any attempt to approach a rigorous classification of the world's stores would not belong to any portion of the task which they had proposed to themselves. Had it been otherwise, what discussions and counter discussions would have ensued—what warring arguments by the learned—what ransacking of musty tomes!

Without finding any fault with the gentlemen of the Executive Committee, or with their classification of subjects, it is quite competent for us, as journalists, to have a classification of our own. Desirous of laying before our readers some indications of the advancement of chemical science, we sallied forth, Catalogue in hand, entered the glass walls, and proceeded straight to the department of chemical and pharmaceutical products. These we reviewed *seriatim*, as our readers know; passed them one by one under notice, indicated their applications, and pointed out their merits and defects. We return to the subject of the Chemistry of the Exhibtion once more, and, without any sort of disrespect to the Executive Committee, we leave our Catalogue behind, and sketch out a new course of procedure for ourselves.

Instead of confining our excursions to the division allotted to chemical and pharmaceutical productions, we shall take a wider range; let us pass rapidly through every part of the Exhibition, and as rapidly discuss in few words the most prominent indications of chemical agencies which are presented to our view. Our entrance is by the South Transept door—on a people's day. Sixty thousand human beings are pent up within these crystal walls, and our wayward contemplation wanders for a moment from the inanimate chemistry of the Glass Palace, to the animate chemistry of sixty thousand pair of lungs. Respiration is a sort of burning without fire, designed to rid the circulating blood of its carbon or charcoal, which latter as effectually disappears by the act of respiration as a piece of charcoal disappears when thrown into the fire: disappears, but is not lost. Charcoal when burned unites with oxygen, a constituent of the air, and forms carbonic acid gas: this is the very gas evolved from the lungs; and, just as heat is developed by combustion, so is heat developed in the lungs. Respiration, then, as we have said, is only combustion without fire. As the presence of carbonaceous matter in the blood is so strongly repugnant to nature that an animal breathes even in sleep: and the heart, never tiring, pumps forth its dark and impure blood to undergo the process of burning off its carbon in the lungs—we may, indeed, be thankful that the evolved carbon is made to assume the form of an invisible gas: had it been otherwise, we should have been from one end of our lives to the other hidden in sooty fumes. Each individual on an average evolves nearly 3000 grains of carbon in the course of twenty-four hours; therefore, the 60,000 people now present will, in the same time, have emitted from their lungs no less than *eleven and a half tons* of the matter of charcoal, which, if collected in a mass and burned under the steam boilers of the Exhibition, would be sufficient to keep in motion the whole of the machinery for about the space of a week. Again, if the whole amount of heat produced by the respiration of the 60,000 people during the twenty-four hours were collected, it would be found exactly equal to the amount of heat given off from the eleven and a half tons of carbon evolved, if condensed into fuel and burnt under the steam-boiler. But what becomes of the noxious carbon, in the form of carbonic acid emitted from the lungs? Nature will not have it in the animal economy, as we have seen; and if an animal be made to breathe this gas, he dies. What, then, becomes of it? The provision is simple: vegetables greedily absorb the very gas which animals reject, reduce the carbon into a solid form, and liberate the oxygen again. Thus is the balance of purity in the air kept up.

The atmosphere contains about one part in a thousand of carbonic acid, and doubts have been sometimes entertained whether this minute quantity be sufficient to account for the carbon which, by metamorphosis of decomposition, enters into the composition of animals and plants. At present these doubts we believe have ceased to exist, Liebig and others having shown that the quantity, though apparently small, is amply sufficient.

But the most curious speculation rising out of the presence of carbonic acid in the atmosphere is in connexion with the formation of coal beds. Coal, as we all know, is but the remains of antediluvian wood, buried by convulsions of nature under enormous weights of overlying strata, and exposed to the decomposing effects of ages unknown.

Now, the various stages of decomposition which wood undergoes in being transformed into coal can be traced—the very structure of the leaves can be seen; by which evidence we know that the coal formations were originally accumulations of gigantic ferns. Ferns, which in this country are mere plants, grow in the West Indies and elsewhere to the size of trees. These fern trees were formerly very prevalent, and from them our stores of coal are chiefly derived.

It has been suspected by various chemists that the atmosphere at the period when the coal depositions were going on, contained more carbonic acid than it does now; botanists, too, had reason to imagine that the fern tribe would thrive in an atmosphere more teeming with carbonic acid than other vegetables. Accordingly, Professor Daubeny, of Oxford, and, we believe, also Mr. Hunt, tried the experiment of growing plants in factitious atmospheres largely charged with the gas. The results went to prove that the opinions of the botanists were well founded, and that in all probability there existed considerably more carbonic acid in the atmosphere when the coal measures were being formed than there does at this time.

As we are on the subject of respiration, let us now turn to the gold fishes. Fishes breathe as well as terrestrials, but they do not breathe by lungs. They have gills—specially adapted to absorb the air which water, in its natural state, always contains. Were the water actually pure, the fishes could not live, neither would such water be fit for the purpose of human drink. At this moment there is a metropolitan clamour for pure water. We have seen that pure water would be quite out of place; nevertheless, impurities admit of classification, and we admit that London water contains impurities of a most objectionable kind.

Carbon being the theme of our chemical lucubrations, away we rush, like other people, to the parrot-like cage where stands the Koh-i-noor: that most precious of Eastern trophies—the diamond that won't shine.

On a previous occasion, in an article on precious stones—the Koh-i-noor amongst the rest—we then stated, that, if the monster jewel should happen to come within the dominion of a European dealer in gems, it would be reduced, by cutting, very materially in size, and, although proportionately diminished in weight, its splendour would be greatly enhanced.

Now the term cutting, though very generally used in regard to diamonds, is very far from the best; grinding would be far better, as, when explained, our readers will not fail to see.

When by chance there is broken off in family service the foot of some treasured glass goblet—it may have occurred to some of our readers to see the thrifty housewife take it to the stone sink, and, rubbing the fractured glass on this—aiding the grinding operation by water and sand—at length produce a surface more or less smooth. On this principle diamonds are ground, with the difference merely that the friction is not given by a stone at all, but by metal—that the metal plate, a flat horizontally revolving wheel, rubs against the diamond whilst the latter remains still; and that, instead of silver sand, the friction powder used is diamond dust.

Diamonds are now chiefly cut, as we mentioned on a former occasion, in Amsterdam. We once saw the operation going on, and will proceed to describe it.

It was on a Sunday, in the early part of 1847, that, being at Amsterdam, we wandered out from our hotel on a chance excursion through the town. Before we had gone far the noise of machinery arrested our attention, and, on making inquiries, we found that it proceeded from the celebrated diamond-cutting establishment of the place. Let not the reader picture to himself a clean, neat, well-looking establishment, such as one of our paper or cotton mills, but an old lumbering shed; in which, impelled by the labour of four or five sorry horses, revolved a horizontal wheel. This was the only source of motion by which the grinding machinery was kept at work; and its primitive nature in a century when the steam-engine is made to spin cotton, grind corn, and weave cloth could not but suggest to the looker-on how remote from ordinary wealth—wealth self-developing and expansive—was the conventional wealth represented by the diamond trade. The operation of cutting is performed in several dilapidated rooms up stairs. There are seen in rapid revolution some scores of horizontal metal wheels, each about a foot and a half in diameter. Their surfaces being smeared from time to time with a mixture of diamond dust and olive oil, and set in revolution, the diamond to be ground is brought in contact with the revolving metallic surface. The operation of grinding goes so slowly on, that if the Koh-i-noor were to be cut according to European taste, the operation would last many years. It need hardly be said, that the task of holding a diamond to be ground firmly against the revolving wheel for so long a period of time as is necessary, would be impossible. Continuous pressure is effected in another and very simple manner: the diamonds are imbedded, all except the part to be ground, in a heavy mass of very fusible solder shaped like a hammer, the handle of which being fixed as to horizontal motion, but free by means of a hinge to move up and down, and the face of the hammer being brought flat upon the side of the horizontal wheel, the operation of grinding, cutting as it is called, proceeds without further trouble.

Numerous have been the speculations from time to time about the original source of the diamond. Coal we have seen is nothing else than woody matter, which has been subjected to a peculiar decomposing agency for countless ages past. The diamond being of kindred composition, has it also a kindred origin? On this point philosophers are still in doubt; but that the diamonds were liquid or pasty at the period of their origin, most people now are agreed. Many diamonds contain, locked up in their centre, a little bubble of air, and some have been found inclosing insects, and small bits of vegetable *débris*—neither of which could have found their way into the middle of crystals whilst in a state of adamantine hardness. So much, then, or diamonds. Let us pass on and see what other chemical themes are suggested by things about us.

The objects which first strike us are the sculptures. They are made of various materials—plaster, marble, zinc, iron, and bronze; all of them suggestive of important chemical reflections, and some of them the direct result of the agency of chemical art.

Let us first turn to the equestrian statues of the Queen and Prince Albert, by Wyatt—intended, as we are informed, for bronze. Plaster is a material good enough for works of art of this and similar stamp. But we have unconsciously diverged; and, instead of explaining the chemical nature of plaster of Paris, we find ourselves criticising a work of art. Plaster of Paris is also called gypsum, and by the chemist sulphate of lime—which latter name, like most others employed in chemistry, is directly indicative of the composition of the body described. Thus, plaster of Paris is a compound of sulphuric acid, or oil of vitriol, and lime—just as marble is a compound of carbonic acid and lime, as we shall discover by and by. The term plaster of Paris is applied to sulphate of lime because it exists very abundantly near the French capital; or rather we should say, that in the neighbourhood of Paris there exists gypsum, which is sulphate of lime chemically united to water, and from which, by exposure to the agency of fire, the water may be driven off, leaving the dry or anhydrous sulphate of lime behind, to which body we may with greater propriety apply the term plaster of Paris.

Since the art of making wax fruit has been so prevalent amongst amateurs, the peculiar moulding property of plaster of Paris has become familiar to most. If a portion of the substance in powder be rapidly mixed in water to the consistence of a paste, and poured into a mould, or on a surface of any kind, the paste presently sets, that is to say, becomes dry and hard, and may be removed from the mould or surface, from which it has borrowed every mark of impression or relief. The chemical *rationale* of the setting of plaster is this. We have seen that by the agency of kiln-burning plaster of Paris was made to evolve a considerable amount of water, which entered into its composition in a solid form. Now this water so evolved the substance takes every opportunity to reappropriate, which being accomplished, the powdered waterless or anhydrous sulphate of lime acquires the same composition and very near the same physical state as it had whilst in the native quarries. But this is not all: during the act of combination with water the plaster expands, and thus is more readily adapted to assume the form of any surface with which it is brought into contact.

Plaster casting may be termed the second stage of the art of statuary; modelling in clay, which will hereafter come under our notice, being the first. Besides its use in this way, plaster of Paris has many other applications, which we cannot find time to allude to here. One, however, must not pass unnoticed, especially as an illustration of it appears in the Exhibition. Some years ago, it was discovered, that by combining plaster of Paris with alum in a certain way, there resulted a very hard substance, to which the name was given of marble cement. Not content with cement, a modification of the same preparation has now been converted into a substance to which they term artificial marble has been given. In the English part of the Exhibition may be seen a very nicely moulded classic capital formed out of this material.

A piece of statuary having been cast or moulded in plaster, the next step is to carve it in marble, or cast it in some sort of metal—usually bronze; but occasionally iron or zinc, of which two latter metals there now exist many beautiful castings. Many a spectator who gazes with admiration over a modern sculptured work of marble or bronze, will be surprised to be informed that in the actual formation of either of these, but more particularly the ones of marble, the artist's hands have been but little employed. His thoughts are exercised, his genius brought into operation, and made to bear on far more plastic materials than either marble, iron, or bronze, zinc, or even plaster of Paris. The sculptured figure is first moulded in pipeclay; which operation being accomplished to the artist's satisfaction, an artizan in casts, usually an Italian, prepares the plaster copy; and from the plaster copy is executed, by mere workmen, the figure in marble or other material. Eventually, the artist gives a few touches, more or less, with his chisel; but very few if the material be marble—indeed sometimes none. The method by which the marble statues are formed by workmen is amusing enough. Before the operator on one side stands the plaster cast to be copied; on the other side, marble in a shapeless block. This latter he first chips into something like the form desired, and then he has recourse to a machine, the operation of which is of this kind:—Suppose the level of the eye of the statue is exactly half an inch below the level of the brow; then, where the eye ought to be, the workman drills a small hole, exactly half an inch below the brow level, and marks the hole black. This operation he repeats on innumerable points; and then, taking his chisel, he chips carefully away every trace of the black perforations. The result of which must evidently be, that, if his perforations were correct, he will have produced the copy of the plaster fac-simile of the artist's clay model.

The metal iron has been usually thought inapplicable to the purposes of statuary, except for the rough varieties of work; and although now its value in this respect is greatly inferior to bronze, yet improved modes of manipulation have enabled the founder to give us admirable specimens of artistic castings.

The general reader will have, no doubt, heard of the terms cast iron and wrought iron. The former is iron in a state of admixture with various other ingredients, chiefly silica and carbon, the result of which is that the fusibility of the metal is greatly increased; wrought-iron is the metal reduced to a condition of comparative purity, by which, although its fusibility is greatly diminished, there is developed another exceedingly valuable quality, namely, that of welding, by which is meant that incipient condition of fusion or pastiness which enables the blacksmith to join two pieces of iron together by merely beating them with the hammer on an anvil. This quality of welding is only participated in, and that very imperfectly, by the metal platinum. Although iron is rather an ungracious metal for the artist's castings, yet exception should be made to a certain iron natural combination with silica, from which the Berlin toy castings are made.

Most of our lady readers, we doubt not, have seen the celebrated Berlin iron necklaces, chains, ear-rings, bracelets, and the like; they are made by casting, and as examples of the perfection of this art are unrivalled. Only one ore of iron has hitherto been found adapted to the formation of these toys, and our readers will, we have no doubt, be surprised to be told, on the authority of the celebrated naturalist Ehrenberg, that the ore in question is but the remains or *debris* of certain little animals now extinct, the skeletons of which were largely made up of iron!

In the Prussian division of the Great Exhibition some of these celebrated castings may be seen; and those who have not yet paid them a visit we would counsel to do so. Infinitely more interesting are they to our taste than the pretentious ostentation of the Koh-i-Noor.

Bronzes are compositions in various proportions of copper, tin, and sometimes zinc. Cannon metal, bell metal, and statuary metal may all be regarded as modifications of bronze. Statuary bronze is moderately soft; but, by a slight modification of preparation, bronzes may be made nearly as hard as steel, and susceptible of receiving a very fine edge. Long, indeed, before the discovery of the means of working iron, and converting it into steel, bronze was used for the purposes of agriculture and war. Some moderns have doubted whether bronze were capable of receiving a keen edge. Sir Francis Chantrey settled this point, practically and for ever, by causing a bronze razor to be made, by the aid of which he shaved. Thus he vindicated the credit of ancient records, it is true; but, as we have been informed, at the expense to himself of a considerable amount of personal suffering. He proved his case, however, which was a great thing; not to be put in comparison with the casual suffering of having a few hairs plucked out by the roots.

The application of zinc to the purposes of statuary is quite new; but, from the success evinced in the works of art to which it has lately been applied by the Belgians and Germans, we have no doubt that its employment for this purpose will largely increase. Nothing can be more fine in every respect than the beautiful Amazon group of Kiss, the Berlin sculptor—this group, we need not inform our readers, is of zinc bronzed.

It is but natural that the discovery of the value of zinc for artistic castings should have been made by Belgians and Germans, inasmuch as from the mines of Belgium and Prussian Silesia is derived by far the greatest proportion of commercial zinc. England, rich though she be in minerals generally, is rather poor in available zinc. Of the ore called sulphuret of zinc we have a considerable amount; but it is difficult to work, and yields an unsatisfactory result. Of carbonate of zinc—the ore in which the two celebrated mines of Belgium, the Vieille and Nouvelle Montagne, and the Silesian mines are so prolific—we have but little; so in the zinc smelting branch of metallurgy we must ever consent to remain largely dependent on our neighbours.

While on the subject of zinc, it may be proper to say, that, if divided into thin shavings, this metal will burn on the application of fire with great brilliancy, yielding an oxide or ash of snowy whiteness, known to the ancients under the denomination of *lana philosophica*—philosophic wool. Very lately this material has been introduced as a pigment, both for rough and artistic purposes. Its advantages consist in being free from the poisonous qualities of white lead, and never turning black by the action of sulphuretted hydrogen. Its disadvantages are, that it will not chemically unite with oil, as does the carbonate of lead, to form a sort of cream, and that it is deficient in opacity. For artistic purposes, it will probably supersede carbonate of lead; but, for rougher work, the poisonous compound will, we think, maintain its supremacy.

SALTER'S MODEL OF THE GREAT OPENING BRIDGE AT SELBY.

There are within the walls of the International Palace of Industry many choice models of bridges, which have been executed by some of our first engineers. Several of them are to be found in the Civil Engineers' or North-West Gallery, while others have been considered worthy of being placed in the great central avenue, or British Nave. Among these, Salter's Model of the Great Opening Bridge at Selby, on the line of the Hull and Selby Railway, is particularly worthy of inspection, and the work represented is of so novel a character, on account of its large span, that we consider many of our readers will be glad to learn some particulars as to the details of its construction.

The river Ouse is at all times rapid, and particularly so during the times of the frequent freshes or floods; it required, therefore, that a bridge of peculiar construction should be resorted to, in order to meet the requirements of the peculiar case. By the act of Parliament for the Hull and Selby Railway, which obtained the sanction of the Legislature in 1836, it was stipulated that the bridge at Selby should have an opening arch of 344 feet span for the sea-borne vessels trading to York. Messrs. Walker and Burges, who have erected so many of the cast-iron bridges which are dotted about in different parts of the kingdom, were engineers for the railway; the bridge, therefore, was executed under their direction; the contract for the iron-work being undertaken by the Butterly Iron Company, and carried out with the usual spirit displayed by that firm. The river at the point of crossing is about 200 feet in width, and at low water 14 feet in depth, the tide rising 9 feet at springs and 4 feet at neaps. The bed of the river consists of silt resting on a thin bed of sand, beneath which is clay of a hard quality. The bridge was commenced in the autumn of 1837, and finished in the spring of 1840. The land abutments are constructed of brickwork and masonry resting on piles; those under the west abutment being 18 feet, and those under the opposite abutment 28 feet long respectively. The intermediate piers for the support of the superstructure are formed of open pile-work, the piles being driven 15 feet into the solid clay, and their tops surmounted with cap sills of large scantling, upon which the iron-work is bedded.

To give additional stiffness to the two centre piers, a plan was resorted to in the bracing, which, although novel in itself, was executed with very little difficulty, and is found, after years of experience, fully to answer the purpose. This was effected by rounding the centre piles for a portion of their length, so as to allow the cast-iron sockets to descend and take a solid bearing on the square shoulders of the piles, to which were connected the long timber braces; so that when the sockets, with the braces attached, were let down to their bearings, the tops of these braces were brought to their places at once, and secured to the cap sills.

The superstructure is of cast iron, consisting of six ribs in the width of the bridge. The opening arch is formed of two leaves each, worked upon a centre carriage, with tail-pieces acting as counterbalances for assisting the opening and shutting when necessary. This is accomplished by an iron segment of nine feet radius firmly fixed upon the main shaft, and worked by a system of wheels so arranged that one man can raise or lower either leaf of the bridge in fifty or sixty seconds.

A double line of railway is laid along the bridge on continuous timber bearers. To provide for the effects caused by changes of temperature on the iron-work of the bridge, wedge-shaped iron keys, fitting into proper grooves at the junction of the two leaves of the opening part of the bridge, are inserted to such a depth as to give the necessary bearing.

The extreme variation of the width of the opening from the above cause is found to be about three-quarters of an inch. The entire weight of cast and wrought iron is equal to about 600 tons, and the weight of each leaf of the opening span rather more than 90 tons.

TO CORRESPONDENTS.

SILVER INKSTAND, BY DODD—The silver inkstand, described in our Supplement of the 21st June, should have been stated as by P G Dodd, and not Messrs Dodd

DELARUE'S ENVELOPE FOLDING MACHINE—In our notice of this machine, it is erroneously stated that Mr Delarue was the inventor. It appears that it is the joint invention of Mr Edwin Hill and Mr Warren Delarue

LECTERN FOR HEREFORD CATHEDRAL—In our notice of the handsome brass lectern, intended for the choir of Hereford Cathedral, exhibited in the Crystal Palace, it was wrongly attributed to the name of Cottercll, whereas it was designed by Mr Nockalls, of Cottingham, in his capacity of architect to the Dean and Chapter of Hereford

In the notices of horological ingenuity in page 601 of our last volume, a typographical error of some importance occurred in the description of Mr Gowland's improved regulator, in the sixth line, where "axis of vibration" should read "arc of vibration"

A N, Rock Lodge—A letter addressed to Messrs Smith and Elder, the publishers, Cornhill, will reach the authoress in question

ZELIA—The Governesses' Institution, 66, Harley-street, London

AN OLD SUBSCRIBER—The liveries should be red and white, the first colour and the first metal in the arms

B H—Harvie, of Alrick, in Scotland, bears "Gu. a fesse or, between three mullets in chief. and a mascle in base, arg." Harvey, of Castle Semple, co. Renfrew, carries "Gu. on a bend erminois, three trefoils slipped vert, on a chief arg., a buck's head cabossed az. between two mullets of the first, and in the sinister chief point of the field, a cross patée of the fourth." The arms of Niddrie, or Niddery, are "Az. a fesse or between three mullets of the last, pierced arg."

A SUBSCRIBER—Arms of Lowick: "Sa. a saltire arg., on a chief of the second three bulls' heads caboshed of the first." The daughters and co-heirs of the late Sir Thomas Haggerston, Bart, have a right to a splendid shield of quarterings, including the Royal arms of Plantagenet.

AZ—Hill of Norfolk: *Arms:* "Gu. two bars erm., in chief a lion passt. or. *Crest:* On a chapeau gu. turned up ermine, a demi-lion passant or, between two dragons' wings expanded of the first, each charged with as many bars of the second"

ERASMUS MALDIN—We can find no arms to the name of Cranswick

AN ENQUIRER—The lady, after her marriage, would retain her title, but substitute her husband's for her maiden surname

J T—Travers: "Arg. a fesse vert between three torteaux." Livesey: "Arg. a lion rampant gu. between three trefoils slipped vert." Danvers: "Gu. a chev. between three mullets or." Weston: "Or an eagle displayed reguardant sa."

T S A—Having no paternal arms, you would not be entitled to bear those of a maternal ancestor

O M—A reference to a Dictionary of Arms, or else an application to the Heralds' Office

AN ENQUIRER—We can find no arms to the name of Westaway. The cost of a grant of arms is £76 15s

L L D—*Crest* of Heale, "On a chapeau gu. turned up erm. a falcon rising arg., beaked and legged or"

A VERY OLD SUBSCRIBER—There is a highly respectable family "Hulse," of Broxmore-house, Hants. We do not think the name was ever "Hulke"

A CONSTANT SUBSCRIBER—A gentleman of the name of Mabb was Chamberlain of London, *temp.* Queen Elizabeth

MARIA THERESA—The decorations might be worn, but they would appear rather ostentatious

UNA—If a lady have no brother, or if her brother have died without issue, she is an heiress in heraldry. It matters not how many other male relations, uncles or cousins, she may have. The crest of Jackson was "A horse arg." That family is no longer extant in Durham

A B—We are sorry we are unable to give any information regarding the family of Norfolk

DIVINITY—Orders in the Church of England require a College education

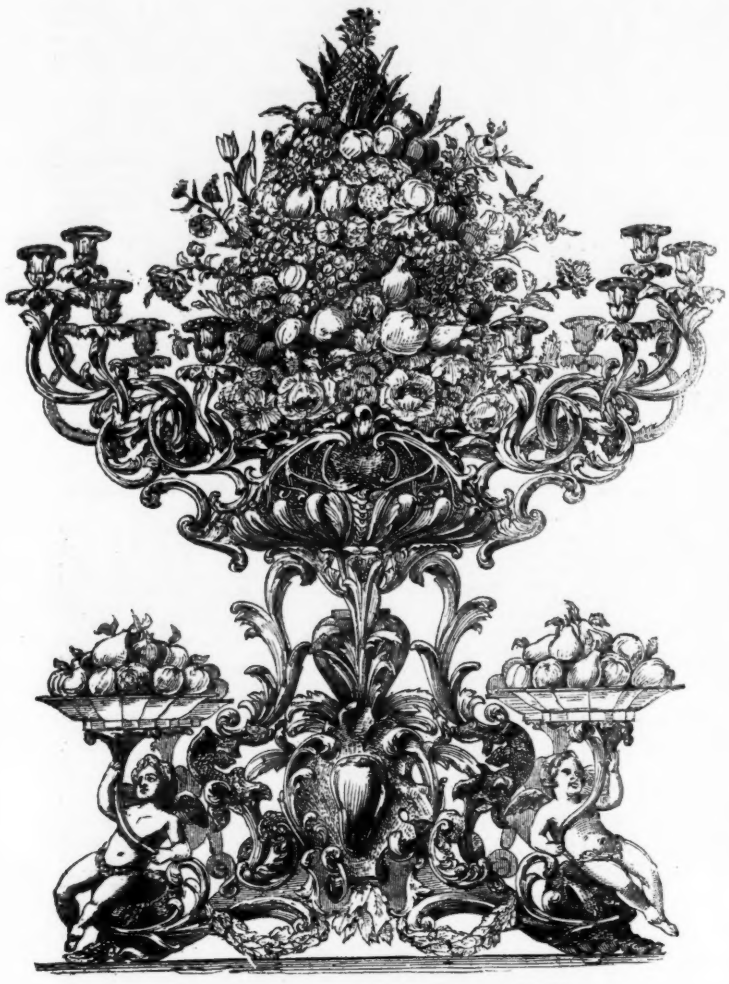
M C O—1. Bennett's-hill, Doctors'-Commons, St. Paul's. 2. You can apply personally; fee, five shillings. 3. To the officer in waiting

MAHER-SHALAL-HASH-BAZ—Jones, of Llwynon, county of Denbigh, bears for *arms*, 1st and 4th—"Erm., a lion rampant sa. 2nd and 3rd, per bend sinister erm., and ermines a lion rampant or"

J W—*Crest:* A winged sand-glass ppr. No *motto*

LOUT—1. The usage of any crest or heraldic device on a seal renders the bearer liable to the tax. 2. "There is a tide in the affairs of man," &c, is from Shakspeare's "Julius Cæsar," Act IV, Scene 3. "Ad hunc modum"—*In this way*

I L B—An illegitimate child is not entitled to any arms until a specific grant passes under the authority of the Earl Marshal, conferring them. The bar sinister is seldom or never introduced in grants of arms to natural children. Once such grants are passed, the arms descend for ever to the male descendants of the grantee

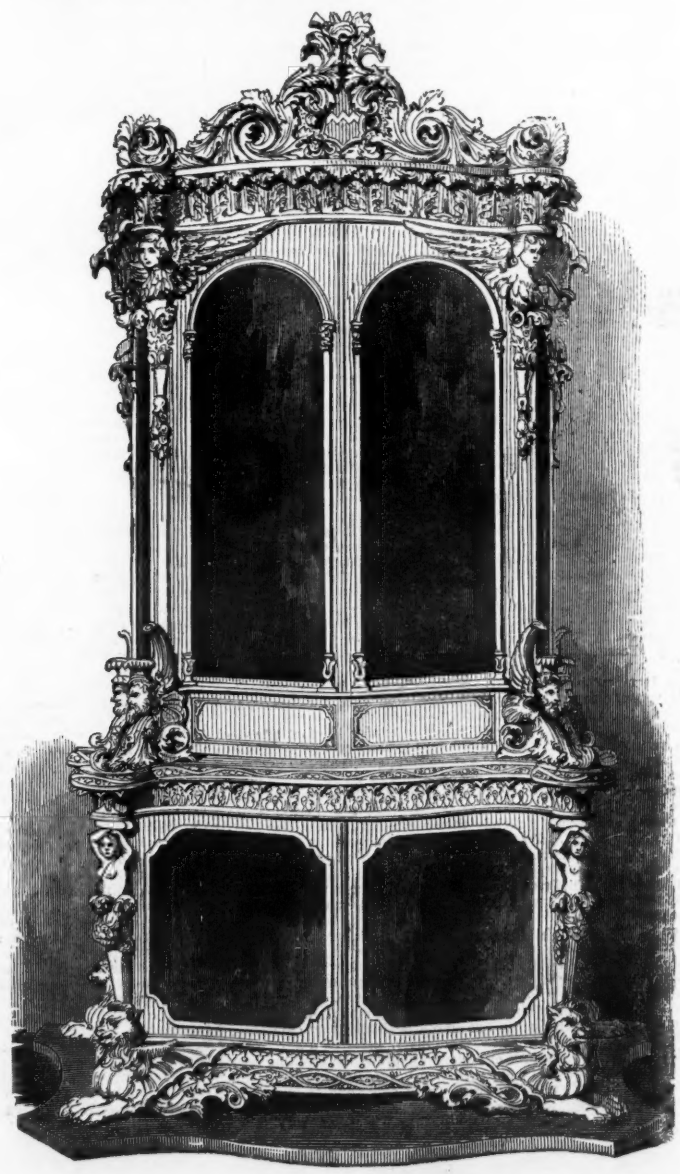


CENTRE-PIECE FOR TABLE.—BY VITTOZ.—(SEE NEXT PAGE.)

STAINED WINDOW.—BY GIBSON, NEWCASTLE.

The Norman tracery window, by Gibson, of Newcastle, the upper part of which is engraved above, is a rich specimen of the art. In the central compartment is represented the Nativity and in the four principal compartments above and below it, two and two, are the four principal prophets, Moses, David, Isaiah, and John the Baptist. The arrangement is simple and effective, and the colouring extremely rich.

CABINET.—FROM TUSCANY.—(SEE NEXT PAGE.)



CABINET.—BY W. AND C. FREEMAN, NORWICH.—(SEE NEXT PAGE.)

JEWELLED HAWK, EXHIBITED BY THE DUKE OF DEVONSHIRE.

The Jewelled Hawk, the property of the Duke of Devonshire, is a new contribution to the Netherlands department, being located not far from Mr. Hope's jewels, with which it divides the attention of the *virtuosi*. The history of this bird is not without interest. It rejoices in a name proper, being the "Knyphausen Hawk," and was made, many a

JEWELLED HAWK.—DUKE OF DEVONSHIRE.

long year ago, to commemorate the reconciliation of two noble Dutch families which had been long at variance. It contains within its gay plumage the identical gold drinking-cup which was used by the rival Counts upon the auspicious day of their reconciling, and which is discovered upon removing the head of the bird. The wings and body are chiefly covered with rubies; turquoises, emeralds, and other precious stones are displayed in other parts. The bird stands about a foot high, more or less, and has a very stately appearance.

CENTRE-PIECE. VITTOZ.

This magnificent *surtout de table* was manufactured by Vittoz, of Paris, for the Grand Duchess of Russia. The design is sumptuous and elegant, and it is executed in bronze richly gilt. This work is a favourable specimen of French decorative art, and will be much admired.

CARVED CABINET BARBOTTI.

We have already given representations of some of Barbotti's beautiful productions in wood carving. We now produce an Engraving of a work of more importance than any of those referred to, and which may justly be signalised as one of the gems of the Tuscan department. This beautiful cabinet, in walnut-tree wood, is of classic and elegant form, and every portion of its surface is covered with sculpture of rich and appropriate character. The principal subjects on the panels are from the "Iliad," which are rendered with a degree of spirit in the conception, and a delicacy of execution, which can scarcely be excelled.

CABINET. BY FREEMAN.

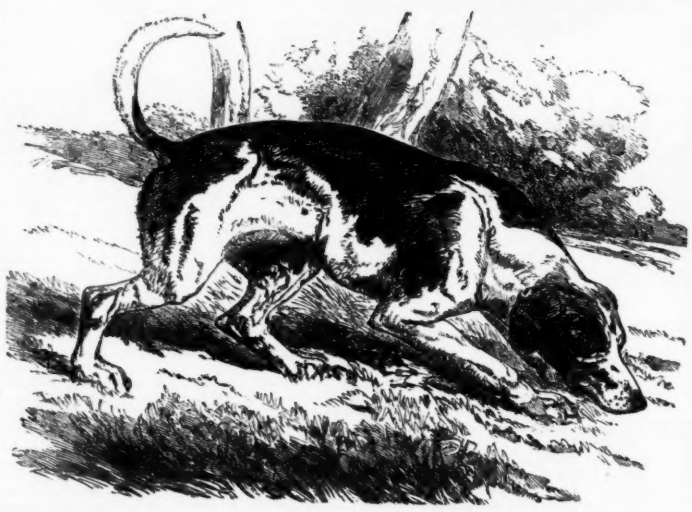
The ornamental cabinet, secretary, and bookcase, carved in walnut wood and ebony, by W. and C. Freeman, of Norwich, is meritorious in many respects, but betrays the fault of over-decoration, without any fixed principle of design. Cherubim, dragons, terminals, and other fabulous creations are brought in plentifully to aid the general effect, which is one of confusion. The workmanship is good.

STUFFED FROGS.—FROM WIRTEMBURG.—FROM A DAGUERREOTYPE BY CLAUDET.

THE NATURAL HISTORY OF THE EXHIBITION.

TAKEN in its widest sense, the title we have just written would indicate an essay on almost all the products—animal, vegetable, and mineral—of the world; for almost all these products, at all events all the most remarkable among them, are to be found represented in Hyde-Park. Not having any intention, however, of trying to solve the problem of making the smaller contain the greater, or of decanting the Atlantic into a pint bottle, we propose merely to indicate the reminiscences of animated nature, as connected with stuffed specimens of birds and beasts, suggested by the Exhibition. We have thought that, amid the countless columns which are being written upon the industry and ingenuity manifested by the Exhibition, amid the unending accounts of processes of manufacture and industrial art, with which the periodical press of the day teems, a paper, leaping from certain exhibited specimens, not forwards to great industrial establishments and singular displays of mechanical skill, but backwards to the productions of that master-worker, Nature—a paper leading the reader from the specimens exhibited, not to factories, foundries, or laboratories, but to woods and mountains, rocks and rivers, would come with a certain freshness upon the mind, and be an acceptable relief from the accumulated and accumulating accounts of the results and the processes connected with the industry of man.

The art of taxidermy is to a great extent misunderstood and perverted. If the mass of the fur or feathers can be tolerably preserved, and something like a rude approximation to the appearance of the living animal be given, the end of the operation is, in the majority of cases, deemed to be attained. We are happy to say, however, that in the Exhibition are to be found several specimens shewing a very different idea of the functions and capability of the art. And we were also gratified by observing in the contributions from Canada a number of well-stuffed birds, labelled as presented by the stuffer to Charles Waterton. The author of "Wanderings in South America" is, indeed, almost the father of taxidermy, as properly understood. We have not at hand at this moment that delightful book of the wilderness, but we remember that it contains an earnest protest against the old plan of stuffing, and a well-merited denunciation of the monstrosities which



STUFFED POINTER.

are exhibited as lions and tigers in too many of our museums It is of course the heads and faces of the animals which are principally deficient. Not only is all natural expression utterly and irremediably lost, but the lips and nostrils are frequently so ill preserved as to have shrunk back, producing a spectral-like appearance which would have frightened even the original *fera* if he had come across one of his kindred, decorated with such a ghastly grin. In some cases, Mr. Waterton observes, that the head of the animal has been entirely cut off and replaced by a painted wooden block, resembling the original countenance about as much as a ship's figure-head generally does the gentleman after whom it has been christened. Mr. Waterton, if we mistake not, invented a new preservative and antiseptic liquid to prevent the shrinking of the cartilaginous and mucous portions of the face; but what he insisted principally upon, and what we also wish to reiterate, is, that the mere preservation of skin and feature is but a small part of what taxidermy ought to be—that the character, gait, and general air of the animal ought to be copied; and that a stuffed specimen is only half preserved which does not give a correct idea of the habitual gestures and mode of standing of the original. For example, there is the badger, a stout, bluff, sturdy, inflexible-looking creature. What a perfect antithesis is the cat, with its habitual crouch and wonderful air of supple springiness! Contrast the curious pert look of a sparrow, especially if he be a Cockney one, with the more staid and decently reserved aspect of any other small bird of a similar species. The acuteness of the look of some dumb creatures as compared with the dismal fatuity of others, is very remarkable; and if the reader who has not much studied the subject will refer to what we may call the comic character stuffed animals from Wirtemburg, he will see an exceedingly clever exaggeration of the intelligence and shrewdness of a fox's face and of the simple stupidity of a hare's. In this case the artist has

STUFFED CATS.—FROM WIRTEMBURG.—FROM A DAGUERREOTYPE BY CLAUDET.

caricatured nature purposely; but nine-tenths of our taxidermists caricature her unconsciously, not by augmenting but by taking no heed of animal expression. How often do we see a stuffed bird, which is nothing but a dead bird placed upright, with glass eyes. The habitual posture and characteristic attitude of the creature escapes, as having been too volatile to be fixed by the hand of man. Nothing of the sort, however. Let the reader go to the Transept, close to the palm trees, and look at the "Gorged Falcon:" if he knows anything about carnivorous birds of prey, he will immediately recognise the perfect *fac simile* of the "greedy glede," who has crammed up to the throat, and stands on one leg on the perch, looking as uncomfortable and apoplectic as an alderman who has over-eaten himself. The skilful taxidermist must, therefore, be a knowing and an observant naturalist. Many a man has probably stuffed a dead bird, never having seen, far less studied, the living creature. Such stuffed specimens are mere exhibitions of the feathers, not of the bird; and the skin of the animal, preserving its coat, would be just as satisfactory. Animals, whatever their stuffers may say, seldom or never stand in a state of stupid, expressionless inaction. They are almost always watching, and the position of the ears is almost invariably characteristic. Even when they entertain not the least apprehension of danger, and when they have satisfied themselves with food, the expression of listless, semi-torpid enjoyment has its own significance, and it is capitally rendered in the gorged falcon.

Canada affords a fair number of specimens of stuffed birds; and the quantity of skins of furred animals, common to the backwoods and the vast expanse of dreary wilderness stretching towards the shores of Hudson's Bay, brings forcibly up to the memory the wild life of the outlying hunters and trappers, who, with their rifle and their blanket, pursue for months of unvarying solitude their chase of the animals whose fur is intended to minister to the enjoyment and the comfort of civilised man. Observe those piles of the skins of ermines, martens, foxes, squirrels, beavers, and sables. How eloquently they speak of the vast expanses of North America—the desolate loneliness of its stretching pine and birch forests—the wandering paths of its nameless streams and rivers—of the solemn stillness of its lakes, sleeping amidst the hills—of the stony and brushwooded tracts of its drear outlying wildernesses.

The Canadian specimens of birds are principally hawks, owls, and water-fowl of the diver species. A Mr. Downs is the exhibitor of most of them, and his groups of owls are particularly good. The black pine-woods of North America are particularly rich in these nocturnal birds of prey; and in the specimens under notice the preserver has attended with praiseworthy diligence to the exact representation of the peculiarly soft, downy, and fluffy appearance of their feathers. These creatures are favourite subjects with preservers; but, somehow, their (literally) every-day aspect is never given. They are made to seem as sharp and wide awake as they doubtless are, if we could see them in the dark. Perhaps a peculiar construction of artificial eye would be required to convey the true effect; but the study of the shades, the casts, and the transparency, and depth of glance of an eye, is properly the province of the taxidermist, who must instruct the glass-manufacturer accordingly.

Next to the owls, the North American sea-birds attract attention. The specimens belong principally to the larger varieties of water birds—the *Colymbidæ*, or divers; and the *Alcidæ*, or auk tribes. The latter is one of the strangest and most original-looking of all winged things. Watch them in their haunts upon a rocky coast: they keep to reefy ridges, and never patronise a shelving or a sandy shore. With wings no bigger, considering their size, than those with which Cupids and cherubs are decorated in ordinary pictures—with great strong webbed feet, placed, as Sidney Smith said of a tropical insect, where, with submission, their tails ought to be—they love to stand as upright as grenadiers upon the pinnacles of rock, just removed from the plash of the surf spray, sometimes making an occasional ridiculous demonstration with their little stumps of wings, as though they were going to fly, or, at all events, intending to convey the notion that they could, if they only thought it worth while; and thus, with their close oily plumage, as dry and tight-fitting to the body as so much feather armour, they doze off the effects of their full meal of fish, caught and swallowed whole in their long dives deep beneath the surface of the sea. The fact is, that, so far as locomotion and the power of obtaining food go, these birds are rather akin to fishes than to feathered things. They cannot move in the air, except in mere jumps along the surface of the water; they cannot walk on the earth, for, when they try it, they continually topple on their noses—we beg pardon, on their beaks. They get on with tolerable speed, however, upon the surface of the water. A strong, big auk will swim quicker than an ordinary boat will row. But under water is their element. The little wings do good service there, and even the native-born denizens of the sphere—the fish themselves—cannot escape the accomplished diver. The fact that all diving birds fly, so to speak, under water, is not generally known; but it is a fact nevertheless. Often have we lain upon a woody bank, all tangled bushes and thick water-plants, watching, silently and securely, the gambols of a couple of water ousels in the bright pool below. The bird in question, to the best of our recollection, does not swim, and is not web-footed; but he dives admirably, always choosing a convenient stone or root along the bank as a *point d'appui*, and always using his wings vigorously as he shoots obliquely to the bottom of the pool.

The rock-birds are further represented in their homes and haunts by a curious and characteristic little model in the South-East Gallery, representing the process of robbing sea-fowl's nests in the Orkney and Shetland Islands. The strata, and rifts, and lines in the face of the perpendicular cliff are represented with more skill and natural effect than might have been expected in the handiwork of a fowler. Like the samphire-gatherer, the bird-catcher hangs half way down astride upon a piece of wood, supported by a rope, which is kept from the sharp edge of the cliff by passing through the notch of a projecting beam of wood; the ascent and descent of the adventurer being regulated by a species of rude winch, planted, by means of a small rough scaffolding, steadily upon the ground, and managed by a couple of men. The constructor of the model, which is well worth inspection, seems to be a poet as well as a fowler and cragsman. Indeed, his work proves that he labours deftly with his fingers, limbs, and brains; his model demonstrating the first, his occupation the second, and his verses, which we transcribe from a card attached to the work, the third. The stanzas are as follows:—

> This model of rock is intended to show,
> The parts which the birds take for nesting,
> As their nature may be, some high and some low,
> While some in the water are resting.
>
> To take up their eggs from such rugged rocks,
> As may by the model be seen,
> To prevent any danger to which I'm no stranger,
> I invented this simple machine.

Worthy Mr. Hubbard, however, the genius in question, would, we suspect, not find it easy to induce his countrymen in Orkney and Shetland to adopt any safety apparatus of the kind. The northern fowlers are notoricusly reckless. A stake or a couple of stakes in the earth is all the support which they require for their rope, while a single comrade above is deemed sufficient to manage it, and prevent the warps from being cut through by grating against the rock.

The Fur Trophy in the Nave, in which is collected so marvellous a display of the most highly valued and delicately soft and beautiful spoils from the coats of the animals of the colder part of the world, is, as it were, guarded and set off by specimens of many of the creatures who have yielded up their covering to make adornments for official robes and ladies' dresses. The furs in their mercantile and manufacturing capacities have been already described; we only pause for a brief glance at some of the animals which yield them. These come from most parts of the cold and the temperate regions of the globe—from the shores of Hudson's Bay and the banks of the arctic rivers in America, and from the dreary steppes of Siberia, stretching down to Behring's Straits, on the Asiatic side of the Polar Sea. There, amid the wilderness, dwells the Russian sable, happily unwitting that his coat is worth from three to ten guineas. In the rocks and snows of Sweden, and generally in Northern Europe, haunts the ermine, which answers to the weasel of southern lands. In winter he gets as white as the snows among which he burrows, all but the tip of his tail, which remains jet black; and so, then being as it were in season, he is trapped or shot, and his coat stripped to make what the heralds call minever, and which is the most aristocratic fur in the world, being principally used for high ceremonial purposes of state, and holding the same rank among furs as "regal purple" holds among colours. The martens are great fur producers. The hunters know several different species. One, the stone marten, dwells in crevices of rocks, in shingly banks, and in the interstices of ancient caving, grey and mossy, or in the hoary walls and ruined battlements of crumbling castles. He is a great favourer of chinks and crevices, and is trapped or snared as he issues forth for a morning or evening prowl from his stony retreats. The first cousin of the stone marten is the wood marten; he is a forester, burrowing about the roots of pine and oak, and seldom or never stirring from the good green wood.

As home relatives to the tribe of the martens and the ermines, we may class the family groups of the squirrels and the weasels. The former is a capital animal for the taxidermist's art; it is elegantly shaped, it possesses a head with a great deal of shy expression, and has a knack of displaying itself to the best advantage, by sitting upright as it munches its nut. Observe the enormous muscle of the creature's hind legs, which make it the famous jumper it is; and observe the manner in which the tail spreads behind it in the leap, so as to steady the flight of the creature to the wished-for branch. Squirrels are nearly as good swimmers as jumpers. A friend of ours rowing across a woodland lake, observed a tiny little brown head bobbing away in the water, and speedily found that it belonged to a squirrel on a swimming excursion. With the idea of capturing the navigator, he tried to stop it with the oar; when, lo! the nimble little scamp leaped from the point of the blade to the crown of the hat of his would-be captor, and with one jump sprang six feet into the water in the other side of the boat, and resumed his course, never, indeed, having deviated from it for a moment. There is something finely woodland in the squirrel. We associate him with glades and brakes—fine old English words both. He is the privileged dweller in oaks and elms of massy girth and glorious foliage. He is the mortal attendant of the fairies, and is always associated with their revels; for when the King and Queen of Faërie dance round the shaven ring, or ride stately by "with bit and bridle ringing," what eye of mortal mould beholds them save that merry black orb which twinkles up among the oak leaves in the moonlight. The greatest number of squirrels we ever saw at one time was in the fair old woods of Burleigh. There was one great clump of oak and beech and elm which was literally alive with them; and little brown furry fairies they looked, darting like birds from branch to branch, or scouring along the grass at lightning speed, their bushy tails erected like hairy banners.

The weasel tribe is well represented in and about the fur trophy. This animal is also good for the craft of the taxidermist. The creature in all its varieties has a litheness and a suppleness of body and a shrewd cunning and quickness of expression, which are thoroughly characteristic. A well-stuffed weasel ought to look at the gazer with a "catch me asleep if you can" staring out of every hair from his nose to his tail. The ferret has a peculiarly foxy expression, with a touch of the reptile in the cold glitter of his eye. He looks murderous; and is, in fact, a desperate traitorous skulker—the very impersonation of cool, artful ferocity, as, with noiseless step and ghost-like motion he glides into and vanishes in the burrow of a devoted rabbit.

In some sort a species of connecting link between the great rat tribe and the feline tribe, we have the pole-cat. There is an interesting group of these creatures near the fur trophy, with weaselly bodies and cat-like heads. The breed must be disappearing in England, the not very pleasant odour of its skin preventing much pains being taken to preserve the species for the sake of its fur. In the wilder and remoter parts of the Highlands, the pole-cat, under its Scotch name the foumart, still flourishes. The same thing may be said of the brock, *Anglicè* the badger, a specimen of which, a bluff, courageous, stand-up-for-a-fair-fight sort of animal, is exhibited.

Stuffed foxes abound, of all kinds, from our own ordinary reynard who drags his brush across Leicestershire, to the beautiful black and silver fox of Hudson's Bay, and the white fox of the Arctic regions. The best specimen of the preserved animal is, however, the realisation—very well done—of Landseer's, we think it is, clever picture of "Not caught yet." The case is in the Gallery above Turkey. We have a grassy bank, with weeds and brushwood. Half concealed in the foliage lies the trap, baited with a piece of mangled rabbit; but reynard is not to be done. With his quick keen eye tracing the trusty iron of the snare, his nose dilating to the scent of the attraction, and his softly-falling feet in the attitude of a stealthy prowl, master fox is the personification of sly caution and cunning suspicion. A wolf in the fur department has evidently been stuffed by some one who never saw or studied the animal. He is quite dog-like. Two cases, containing stuffed otters, have been contributed by the Marquis of Granby. They are fair specimens of the art. The eel-like glide of the otter is well caught up as he appears to us in the act of rustling through the sedge to the neigbouring stream. There is no more interesting animal to watch than this fresh-water seal. From some sheltering tree overhanging a Highland stream, see him, if you can, chase a hapless salmon round and round the crystal pool, lying in its deep rocky cauldron, green and pellucid, beneath. The hunt seldom lasts long; either the prey manages by a desperate dart out of the pool to make his way into the bickering stream above or below, where the otter is not so much in his element as in deep still water; or he is pounced upon, dragged to a shelving brink of rock, and the most delicate portion of his flakes—that immediately at the back of his head—speedily eaten out; after which, his captor, who is a very dainty gentleman in the matter of fish, leaves his quarry to the next comer.

The only other specimen to which we shall call attention in this part of the Exhibition is that strange animated link between two families, the *Ornithorincus paradoxus*, which looks something like a small polecat with a duck's beak sewn on to its muzzle. There are two specimens in the Nave—*apropos* of which some one has remarked that the creature is like a dunning tailor, because "it is a beast with a bill!"

In the Transept, just before the palms, are deposited by far the finest specimens of taxidermy in the Exhibition, those shown by Mr. Handcock. They are all birds: the plumage is beautifully displayed; the natural tints preserved in all their freshness, and the characters and motions of each individual imitated with the knowledge of a naturalist, and the tact and skill of an artist. First, we have a hooded falcon, showing the paraphernalia in which the bird was equipped for hawking. The animal itself is a noble specimen of a highly-bred and vigorous hawk. He wears his hood upon his head; the hood in question consisting of a close-fitting cap of leather, which completely blinds the bird, and was only removed at the moment of flight. Its legs are manacled by jesses, stout thongs of leather, with which it was bound to the wrist, sitting upon the sportsman or sportswoman's hawking gauntlet. The next specimen is called the "Struggle with the Quarry." The falcon has towered above the prey, a fine vigorous heron, swooped down upon it, and with beak and claws struck deeply into the struggling bird; the twain have tumbled, a mere chaos of fluttering feathers and jerking limbs and claws, upon the earth. The struggle is painfully life-like: the heron, with its breast and throat torn by the hawk, and the red, raw, bleeding flesh seen amid the rumpled feathers, seems vainly jerking his long bill, and attempting with his strong wiry legs to hit off his antagonist, who is tearing him with beak and claws. The convulsive movements of the victim are represented with great truth; so contorted, indeed, are its members, its pinions, and limbs, that you must look attentively before you understand the position of the bird: the fierce impetuosity of the hawk is also very truthfully rendered. Still, like many of Landseer's finest pictures, the group is a painful one; indeed, we suspect that it is a blunder in any species of art to represent artificially a sight, which would wound our feelings if seen in reality. Nay, even the keenest sportsman, although he knocks over his game without the slightest twinge of a humanitarian scruple, would possibly not wish to have continually before his eye a vivid representation of the sufferings of the wounded bird.

Close to the "Struggle with the Quarry," is the very clever "Gorged Falcon,' which we have already pointed out as a triumph of expression in taxidermy. The stupid, blinking look of the bird—the half shut and dimmed eyes, and the oddly wrinkled cheek, with the indefinable expression of painful helpless repletion which pervades the whole individual, are all very cleverly caught up, and very effectively reproduced. The hawk sits, listlessly and half asleep, upon one leg—the other claw, still red from the slaughter, retracted by the involuntary tendency of the muscles up to the breast. The animal is in such a state that you might almost fling your hat over him. A weary task and a mighty labour would it be to fly, until digestion has done its work and something like spirit and alertness be restored. Turning from a gorged hawk to a hungry vulture—the stuffed lammergeyer of the Alps is represented as perched upon the rocky jag of a bare mountain peak, searching with his fierce, wild, hungry eyes, the valleys and ravines below. The attitude of the creature is very graceful, and full of life and vigour.

Close to the lammergeyer we have a group of black game, nicely arranged; and near it a "scene in the tropics," consisting of a little bank or knoll grown over with luxuriant vegetation—all tropical, of course—in the midst of which a collection of parrots and cockatoos, love birds, and some specimens of smaller winged creatures, are perched, apparently leaping, chattering, and hunting for the gaudy butterflies and glancing lizards, and black shining beetles, which are crawling and passing to and fro. The aspect of the group, plants, birds, and insects, is very gay, the plumage exceedingly gaudy and rich, and the habitual vacant brainless look of a parrot very well imitated. Still our home birds, whose habits and whose air are known, have more charms than the most glittering of the tropic fowls. A "young leopard reposing" is a clever cub study; the clumsy limbs and coarse bony-looking frame of the creature being happily represented.

The "Dead Gull." We are still in the domain of Mr. Handcock, who represents a bird of the species in question, newly shot and fallen beneath a small withered branch, such as we sometimes see left by the tide, hung with a green drapery of dank sea-weed; the twigs of this forlorn stranded branch serving as a *point d'appui* for the representation, in a swooping posture with outspread wings, of the mate of the dead bird. The attitude of the latter is strictly natural, and the half-closed filmy eyes perfect; while the posture of the sorrowing survivor, seeking as it were to rouse and revivify its defunct partner, is thoroughly expressive of its restless, bewildered grief. The group, in fact, puts one in mind of Landseer's picture of "The Widow:" and, like that scene of honest animal distress, it is gentle and graceful, but painful. There is no more meek-looking or graceful a bird than the smaller sea-gull here represented. When seen close at hand, this creature is dove-like in the mildness of its expression; and the calm, meek look which a wounded sea-gull fixes upon the person who takes it up, has something in it irresistibly, and to our minds most painfully reproaching. In the Gallery in the North-eastern Nave is another very carefully preserved representation of a dead gull of the same kind; the attention of the spectator being drawn to the representation of the slight rose-coloured tinge under the wing, which is found in the feathers of the living subject, but which gradually fades away after death. Some staining or dyeing medium has in this instance been resorted to, so as to make the effect permanent. To a greater or less extent, however, the vivid representation of dead birds, their feathers rumpled, and their limbs distorted, as they may have fallen to the earth, is foreign to the intention of taxidermy, which is out of dead materials to represent actual breathing life, while the associations connected with the violently killed creatures in question are by no means soothing or agreeable.

We now mount into the inner North-Eastern Gallery, where a considerable number of the specimens of taxidermy are gathered together. The first case which attracts attention, or rather the first succession of cases, have been contributed by Mr. Gardner, bird preserver to her Majesty. As a whole, the specimens are far inferior to Mr. Handcock's. We do not mean to assert this with reference to the actual neatness of the mechanical getting up of the birds, but in respect to the lack of character and sentiment displayed; the want of individuality among the specimens, and the over-crowding together of birds of different kinds, and generally choosing different haunts. It ought to be an axiom in taxidermy, as well as in other and less technical matters, that "birds of a feather flock together;" not that we would have a certain degree of observance of the maxim interpreted into a recommendation to stuff in the same group a half-dozen of crows, or a dozen of herons, or a score of magpies, but there are certain classes of birds eating the same species of food and haunting the same general species of soil, which may be well and truthfully grouped in clusters, the natural fidelity of which would be outraged by the introduction of a single individual not in some way connected with species or family. Now, in one of Mr. Gardner's groups a fox is introduced in absurd proximity with a covey of partridges; reynard not crouching and hiding himself, but in full view of the timid birds, who seem in no way to mind his presence. We contend, then, that taxidermy, until it frees itself from blunders such as this, will not be taking that art-rank to which it may legitimately become entitled. It is not enough that animals should be represented to a greater or less extent as they are when alive; it is needful that they form and shew the condition of life. If you stuff and preserve an animal perfectly, and yet distort it into a posture which it would never naturally assume, you err in your work, just as you do, if, putting the creature into a proper position, you introduce an influence or an individuality from which, in life, the represented animal would fly.

Mr. Gardner exhibits a brilliant case of humming-birds. All representations of this race, however, have the fault of appearing to be rather feathers than birds: the eye is dazzled by a kaleidoscope-like glitter of gold, and purple, and pink, and yellow, and blue, but all the birds appear to have the same characteristics—colour forming the only individuality or distinction. The best thing in Mr. Gardner's cases is a branch with a couple of love-birds, represented as scratching or tickling each other with their beaks. The group is a bit of natural truth, and therefore pleasing.

Next to Mr. Gardner's is placed the contribution of Mr. Bartlett, of Camden Town—not equal to Mr. Handcock's specimens, but much less drawingroomy, and with far more attention to individuality and expression than Mr. Gardner's. The birds in question, when formed into groups, are not so crowded as those of the latter preserver, and look more like natural collections, and less like artificial happy families. A huge sleeping baboon is not an agreeable object, but it is cleverly done and very expressive, while the clusters of game are life-like and effective.

Turning the gallery corner, we come to an interesting case of the principal wild animals and birds of Sutherlandshire. This remote and little known county—*vide* Mr. St. John's excellent "Sporting Tour"—contains, nevertheless, perhaps the richest fauna of any of our British provincial districts. It is a peculiarity of districts placed so far north, that they very frequently unite the birds of the Arctic seas and coasts with those of more temperate regions. Thus, dotted all over Sutherlandshire, in deep sheltered valleys and fenced in cerreys of the hills—delicate birds, such as the golden crested wren and the little blue titmouse, build and warble. On its lone sequestered mountain tarns are to be found the rarest aquatic birds—the black-throated diver for example, and the wild goose, a bird which Mr. St. John says is more wary and more difficult to stalk than red deer. On the inland ridges the golden eagle builds its eyrie; and along the tremendous cliffs on the sea-coast, the osprey, or sea eagle, almost as fine a bird, finds a refuge, along with innumerable northern sea-fowl, puffins, guillemots, and razor-bills; rock pigeons, which skim the surf, and the rare Cornish chough, which "wings the midway air." The illustrative case in question comprehends all varieties of game, bird and beast, from the roe-deer to the rabbit, from the woodcock, which haunts the marshy rivulets in the sheltered places of the woods, to the ptarmigan, which dares the white winter drifts on the mountain tops. The exhibitor is Mr. Dunbar, from the remote regions of Loch Inver, and altogether the collection is a very creditable one. In the next case, besides a number of humming-birds of the usual character, is an ugly monstrosity, consisting of a huge swollen frog, contrasting with the morbidly small growth of a dog, which, unless it be a made-up specimen, has not attained the size of the ordinary rat. Except as physiological curiosities, a taxidermist who preserves such cases of morbid development, or morbid lack of development, has very little to do. A couple of stuffed figures, called "Life and Death," exhibited by Mr. Bartlett, have decided merit. They consist of a living dog standing over the still quivering carcass of a roe-deer. The expression of death in the fallen animal, shown in the huddled-up posture, the perfect relaxation of the muscles, and the accidental disposition in the accident of falling of the limbs in a fashion which would be inconsistent with the animal's convenient command over them were it in life, the attention shown to all these minutiæ, which nevertheless make up the essence and character of the scene, prove how carefully the artist has studied his craft. The dog is not so much to our taste. He is a commonplace looking animal; and, although obviously alive, does not show that superabounding vigour of life which might have contrasted with the nerveless limbs of the fallen deer. Close by, a model of that ugly old extinct bird, the dodo, attracts a good deal of attention. Mr. Bartlett is the exhibitor. Besides the specimen shown, casts of the preserved head and foot existing in the Ashmolean Museum, with sketches by German *savans*, pourtray the probable physical conditions of the creature. The few specimens of this remarkable ungainly bird, which are recorded, came, as most people are aware, from the Mauritius and the Indian Archipelago; but very little, if anything certain, is known of the creature's habits, except that he has the reputation of having been endowed with a most remarkable process of digestion, which, it is said, even a lump of stone could not resist. Notwithstanding this enviable order of stomach, however, the dodo is no more, and we really congratulate the whole feathered race upon the fact of so ugly a member of their family having vanished from the earth.

Amid the wide range of foreign industrial products, stuffed and preserved animals are to be found only in that portion of the Zollverein consecrated to Wirtemberg, and these form a very conspicuous feature in the German exhibition; the defile—both sides of which they line—being one of those points in which policemen have to be stationed to marshal the crowd "the way that they should go." Our remaining space affords room, however, for only a very brief notice. The specimens are of two classes: ordinarily preserved birds and beasts, aiming only at being fac similes of living nature; and animals of various species, endowed with a caricatured expression of human intelligence, and represented in illustrations of legends and fables, as occupied with human pursuits and performing human actions. We take the first order to begin with. On the right of the corridor are two very large groups of animals, the size indeed of life, representing a pack of dogs bringing to bay and pulling down in the one case a wounded boar, in the other a stricken deer. The animals are well preserved, and artistically grouped; the fierce eagerness of the dogs and the frantic struggles of the quarries being suitably represented. Both groups, indeed, might have been formed from Sneyders' hunting pieces, the dogs in particular being fac-similes of

those which that artist delighted to draw. The subjects, however, are disgustingly painful; and, unless the artist meant them to ornament the vestibule of a slaughter-house, we can hardly see what possible destination he intended for his handywork. The largeness of the scale on which the details of the slaughter are represented makes the whole thing absolutely revolting. Two miniature models of similar scenes call for no particular notice. A number of well stuffed hawks are suspended in the air by strings, their wings outstretched so as to imitate the act of hovering. The notion is ingenious, but we fear, that, to be artistically true and satisfactory, every object must have a natural and obvious, and not an artificial and unconfessed means of support. The groups of owls and hawks with their young are unexceptionable. The falcons feeding their nestlings are excellently managed, with equal picturesque grace and effect. The attack by the polecats upon the hawks' nest is a good piece of dramatic taxidermy; and the gambols of the litter of fox cubs, while old Reynard appears bringing a partridge for distribution among his family, form another pleasing group.

Turning to the *quasi* human animals, we recognise at once the practical exemplification of that odd tendency in the Teutonic mind to gift brutes with human intelligence, and to make them take parts in long, and sometimes exceedingly droll histories, just like men and women. Some good specimens of these stories are given in the "Pilgrims of the Rhine." They are not properly fables, but rather half comic, half serious legends, generally full of subdued and characteristic significance, and going in a great degree upon the development of character in the brute *dramatis personæ*. Of these the fox always figures as the scamp of the piece—no doubt, a clever, insinuating, gentle, manly scamp, but a scamp nevertheless. See him here devoutly confessing to the cock as a priest; next see him kidnapping the poor unsuspecting hare, of whom he makes a tool to serve some of his private ends. Then observe him contemplatively meditating over the volume in his lap, while he smokes his pipe, the better to digest a puzzling topic. In all these clever specimens of eccentric art taxidermy, the natural cunning and intelligence of the fox's face is exaggerated with very great skill, while the natural simplicity and stupidity of the hare's countenance is just as forcibly worked out. The group of the "Fox and the Hare," *Reineche* bringing *Lampe* to Court, is a perfect study. The animals are endowed with the strangest human expression, and yet they are animals still. We have engraved a specimen of this curious style of taxidermy. Observe, the expression being so much exaggerated, the specimens are rather caricatures than real art; but the preserver must *a fortiori* be capable of producing the nicest gradations of real expression in the face of bird and beast. There are a great many minor specimens of small animals, and models of larger ones, engaged in human actions, such as a party of tabbies drinking tea, a number of large animals of the weasel tribe as sportsmen, with beaters of a smaller species, hunting an unfortunate flock of hares; weasels fighting duels; frogs walking genteely out with umbrellas; rabbits trying in vain to do sums on slates; and cats singing and playing the piano; but our space will only permit our begging the reader on his next visit attentively to study and note the curious degree of skill and drollery displayed in these most amusing caricatures of natural history.

ADORNO'S CIGARETTE MACHINE.

This machine consists of two travelling chains, whose parts are made with great accuracy. Each link is composed of 12 pieces, which are cut out of iron by machinery. One portion of the link is fixed on the chain, and the other portion is moveable. It is necessary that the machine be so adjusted as to provide for the proper quantity of tobacco and paper, and which must be regulated to the thickness of very thin paper.

The machine performs 14 operations:—1. It develops the paper. 2. It moulds the paper. 3. It inserts and presses the tabacco. 4. It regulates the amount of tobacco. 5. It brushes away the tobacco in excess. 6. It cuts the paper and divides the cigarettes. 7. It prepares the cigarettes to be folded. 8. It folds the cigarettes. 9. It transfers and finishes the cigarettes. 10. It prepares the ends of the cigarettes. 11. It finishes their ends. 12. It sends the cigarettes arranged to be packed. 13. It registers the number of cigarettes. And, lastly, it cleans itself.

The machine makes and finishes the cigarettes with greater neatness and perfection than by manual labour; and the economy of tobacco is so great, that, solely in this respect, the price of the entire manufacture by hand labour is wholly saved. More than eighty cigarettes may be made by this machine in a minute. Paper of the proper width and thickness is caused to pass over one of the travelling chains, consisting of links corresponding with the scantling of the cigarette. When the paper has a sufficient number of indents, fine tobacco is put into them, and the waste falls into a trough beneath the machine. As the chain on which the paper is first placed moves forward, a knife, by means of a reciprocating motion across the machine, separates the paper to form the cigarettes, which are finally folded entire, by passing to the other travelling chain; and by pressure from above the cigarettes are completed ready to be removed from the machine. In the English market there is scarcely any demand for cigarettes, but in Spain and the American republics its importance is great. This will be better understood, when we state, that, in Mexico, 8,000,000 dollars worth of cigarettes are consumed in the course of a single year. The consumption of cigarettes in Spain and Havannah is proportionably greater. The cigarette machine is seldom worked at the Exhibition, as the materials (principally tobacco) are of an expensive kind; and, as the machine would convert a hundred weight of tobacco into cigarettes in a single day, too much expense would be entailed; but coloured sawdust, as suggested by an ingenious friend who was looking on the other day, when we had an opportunity of seeing the machine in motion, would answer the purpose very well.

LETTERS FROM LONDON
ON
THE GREAT EXHIBITION AND OTHER MATTERS.
BY PELEG E. WHEELER,
WITH AN INTRODUCTION BY BAYLE BERNARD.

(*Continued from page* 31.)

LETTER VI.—TO DEACON BIGELOW, AGAR-HOUSE, COOK'S FERRY.

THE OPENING DAY; MODERN PROPHECIES; THE GLASS-HOUSE SYMBOLS AND DEFECTS; THE MAJOR'S WALK; THE LONDON STREAM; HIS SEIZURE AND ESCAPE; AND ULTIMATE DELIRIUM!

RESPECTED FRIEND,—

The opening day! Here it's come, and that's a fact—roll'd round to us at last, as sure as the best spoke in a wheel, or mid-day on the clock. Here it's come, as it was bound to do, out of a sky as clear as truth and as soft and pure as childhood; come, bright and kind, and gentle as the first face we loved to look at. The stars know'd what they'd to do—they watch'd over it all night, keeping clouds from it and cold, and delivering it up to us at dawn, bright and balmy as behoved it. I guess that morning was bespoke, it could scarcely have come by axydent. It was Natur's contribution to the Great Show of the day—Natur's proof of her own sympathy in a cause that must make our speshy git suthin' of her own sperit, and larn at least to watch her laws; nothing of extremes about it, neither hot nor cold, but well balanced, of even pressure, and, in short, a good embodiment of the progress it relates to. The opening day was jist the day, Deacon, that you or the Doctor would have wished for, and thought properly significant of the great affair in hand. And there's suthin' in the name too. Han't the "opening day" a sense in it as strong as opening flowers? Aint it stretched as tight with meaning as a gooseberry with juice? It's true the Doctor tells us there's nothin' in a name, and he quotes a big authority—nothin' short of Shakspeare; but I reckon the world of his time warn't quite as spry as our'n—warn't scarsly as well awake as the locomotive ery. All his genus couldn't help him to paint the reign of steam, or dream about the telegraph. Now, I say that names are things, or, what's next to it, they are the skins to 'em; and I reckon you'll mostly find that a great fact has a great title: and aint the "opening day" a proof on it? Don't it speak of suthin' more than jist unfolding warehouse doors? Don't we think of grander openings—openings of thoughts and feelin's; openings of human intercourse, of social truth and progress, of light, and peace, and freedom;—to say nothin' of the opening of the eternal lot of mouths which this morning went to work like so many high-preshure engins?

Yes, the day is come, Deacon, notwithstandin' the thousand fellers that swore so hard it couldn't—and couldn't, for all I could learn, jist because it ought. Nothin' is so onconceivable to some folks as a great good. The Almighty must perform a miracle to take care of his own critturs. Now, misery comes to us nat'rally—that's the thing we're born to. and some will tell you it's a sin if we endeavour to avoid it; that it's agin the command of Scriptur; that it's rank wickedness to take chloryform to diminish nat'ral pains; or to raise wheat without perspiring, if you live in ever so cold a country. That's the usual way. I reckon, truth has allers been disfigured by poor stoopid mole-eyed critturs taking the letter for the sperit. But, for all that, the day is come, Deacon, notwithstanding the gloomy faces, and the heavy-hanging foreheads, that looked like ripen'd pumpkins too heavy for their stalk; that raelly seemed so full of fruit they were a'most on the pint of burstin'. Notwithstandin' all their droopin' and their terrible forebodings, and their fears of a big calamity, and their sartainty of the sin, here the day is come in spite on 'em, to teach 'em better doctrine, and show it warn't the Pagans only that were troubled with false prophets. Here the day is come, without conspiracy or pestilence, or the least mite of commotion, except in people's hearts—in kindly thoughts and wishes, and a proper heap of expectation: and this leads me to see a principle, which I reckon might be useful in our futur' calkylations, might help us to construct a sorter social almanac; and my principle is jest this, that whenever a good thing is going to happen, it's allers sure to be call'd impossible; and the greater the amount of benefit, the greater proof it won't turn up. Take our centry as a proof. When, forty year ago, it was proposed to light the streets with gas, warn't that good called impossible, tho' the year afterward it happen'd? warn't it said to be an attempt to blow London into shivers, to put a volcano into pipes and have a vent at every door—twenty thousand eruptions all going off at once? Then agin in regard to steam; warn't we told that it was impossible that steam should cross the ocean, only six months afore it did? Warn't it larfed at as a lunacy, jist as the *Sirius* got afloat? And agin in vaccynation, when there was a sorter human murrain, thinning the English off like cattle, and 'twas proposed to check its ravages by weakening its attacks, warn't that too call'd impossible, and wuss than that, quite impious—trying to make people live when 'twas clear they were ordained to die—when they were falling in a pestilence that was plainly the will of Heaven? And so in regard to the World's Congress; that was as mad and as bad as anything, tho' here it's come to pass, and with no greater amount of wickedness than teaching us to be friendly, and to live by honest labour. So I affirm it as a rule, Deacon, that whenever a thing is howl'd aginst and declared to be impossible, you may be as sartain as the sun that it's going to happen instantly.

Yes, the day is come, Deacon, full charged with light and cheerfulness; and if there's a roof that gets its share on it, I guess it's the World's Warehouse—that covering for all the wonders of human skill and energy, and yet the biggest one itself;—England's grandest contribution, show what she may inside—a most uncommon proper casket for the gems of good King Industry. Now, I aint told you what I thought on it—what was my first and best impression when I luff'd up to its side; and if you would like to know it, I must tell you that I wouldn't lose my balance, whatever was the preshur so in order to that eend I sot right down afore it, with my back agin a tree, and took a'most two hours to come to a conclusion, and the pint I reach'd was this—that that house is nothin' short, Deacon, of a pictur of human progress; that there' a meaning in every joist of it, and in every inch of window-pane; that from the basement to the roof on it, from the doorway to the crown, it shines out as the embodiment of an everlastin' truth. Take its substance, glass and iron, and what do these two signify? Aint it strength and clearness? and aint these the very qualities that our speshy needs the most? I want to know if there's a chance bigger than the little eend of nothin' of our making any progress without we're equally strong and honest? Then agin, its figger; jest reflect a bit on that; low and well set for the most part, taking a firm grip of the earth, and not narrow, weak, and lofty, as if 'twas a thing too good for it; and I'll jist ask agin, if these aint more of the proper elements, humility and prudence? Whilst as modesty is allers not only a source of strength but beauty, see its top rounding off into a brow of grace and splendour, lifting up to the smiling heavens its thousand eyes of gladness, as it drinks and radiates their light like a huge dimond in the sun. That house, I say agin, Deacon, is a symbol of our speshy; and if they ever think to pull it down, I shall vow we're tumbling with it.

And so you'll guess, of course, that about my happiest hour in England was that that brought me up beside it, and you wouldn't be far wrong; but no happiness is perfect, Deacon, everything is qualified, I s'pose to make us wish for more, and so, out of our discontent, raise a sufficient supply of energy. And so, agreeably to this law of natur, I felt the Great Warehouse was deficient, and had two or three big stains on it that curdled my comfort mightily. I'll jest name 'em to you, Deacon, that you may see I aint grown an Englishman, and taken to grumbling jest as nat'rally as swallowing fog and porter. In the first place, they put up afore the door on it the figger of a fighting-man, a great warrior on horseback, who spent his life and lost it in slaughtering his fellow-beings, and not sitting, as he might do, calm and thoughtful, as one would hope, at the door of such a building, but with his fist up in the air, stretching out a long sharp stabbing-iron, as tho' he was going to work at once upon the bodies of the visitors, or was holding up his plaguey broadsword as a sort of devil's cross,—for all the world to worship it. Now, aint that suthin' shocking? to think of sticking up such a figger, the sign strife and bloodshed, afore the house of peace and amity; unless indeed it's meant to show the great purpose of the building—to put the past world out of doors, whilst the futur' lies inside of it, tho' in that case, I conceive, seeing folks are so plaguey stoopid, the fact should be dooly printed and hung on the horse's neck or tail, that they might look at it in the proper sperit—not to honour but avoid it—jist as boards serve on the ice to tell us when it's dangerous.

But there's another pint to mention. I regret to tell you, Deacon, that the sperit of fraternity aint as strong inside as out; that that happens to be the commodity in which the show is most deficient. The flags of every country waving and mingling on the top are a proper emblem of the feelings that are uniting all about it; but once you get inside, I guess you'll find that prejudices stand as distinct as the several counters. This aint the proper moment to discuss the matter fully; and arter the support I've given the scheme, 'taint for me to run it down, because some folks have used me shameful. This is the common course, I know, but I aint going to be so mean; so I'll pack the case in a few words, and throw it in a corner. They've refused my contribution—I vow if 'taint the fact; neither my sausage-trap nor skull-cap are to be found in the Exhibition; and you'd guess from now till no time before you'd larn the reason. In the first place, it's a pint of order, because I didn't lump 'em up with the gin'ral American contributions, which was of course to acknowledge that mine warn't at all superior; and 'twas likely I'd say that now, warn't it? And next, would you believe it, because they say they couldn't classify 'em, couldn't tell under what head they were to go into the catalogue—whether the practical or the fine arts. Now, since the hour you were raised, Deacon, did you ever hear such proper gabble—such an uncommon lot of braying, except from critters dooly qualified? Practical or fine arts! as if they warn't the two together, and I had any need to show that this is jest their grand distinction. But there's a wuss complaint to come; I pass over my own wrong, I go on to the public's, and that's one you'll never guess if you could calkylate as well as the whole state of Massachussetts. This building, that invites the entire world to stock its counters, aint a free one arter all; it's free to goods, but not to men. It throws its doors open, it's true; but says you must pay to enter them! What do you think of that, Deacon? This great Fraternal Building to become a commercial spekylation—not a focus for the diffusion of a moral influence throughout the world, but jist a counter over which to take a lot of the world's money; a spot to sell the social benefits it preaches up so grandly, and to call on furreners to pay for a handsome ornament to London! Now, I want to know if such a notion aint a blot on the hull project, aint a downright dab of dirt on it? To tell strangers, who send their goods and bring their persons to this capital, and so pour a flood of money thro' every channel of the country, that they must not only pay for show-room, but, when the show is over, leave the building that they've help'd to raise as a present to the country! Now, aint that a clever way of getting architectur cheap? I want to know what they'd have said, if we Yankees had done that. Wouldn't the papers have come out a spell on our calkelating natur, and our love of the main chance? I guess this aint the first time that good old Mother England has done the very thing she sees so wrong in her son Jonathan; and s'posing he did it arter her, jist in a sperit of filial reverence—oh! wouldn't she become disgusted, and put the cow-skin to him properly!

But now to detail the event, Deacon, the great business of the day—the opening of the flood-gate to the stream of all humanity. The morning, as I told you, turn'd out to be first chop, as good as if bespoke, made to order in Indiana, and sent across for the occasion. Well, you'll guess that in our garret we warn't inclined to oversleep ourselves; even if we wanted expectation, we hadn't too great a stock of air, and our mouths were forced to open, whether our minds were closed or not. Besides, as my friends happened to be all on 'em revolutionary, 'twas nat'ral, of course, that they should rise at the first moment. But here I've got to note a most oncommon want of deference, a piece of ignorance or neglect, that I consider downright scandalous. Notwithstandin' the great occasion of a morning such as this, I'll be skinn'd if 'twas honour'd by a single grain of powder! There warn't a gun or e'en a cracker by way of noticing its dignity. Now, in America you know we allers think a celebration is entitled to a messenger, and we send some guns afore it, to tell people to look out. It's a notion among us, that's putting guns to their true use; that, as they happen to have long throats that can speak to thousands at a time, to make 'em give the signal for hoorahing to the public—to pitch the key of a grand chorus—is about their proper eend, and a way to make 'em minister to the public good instead of misery: so I need not tell you, Deacon, if this "opening day" had only been with us, what an etarnal lot of thunder we'd have got up for the occasion. We'd have made noise enough, I reckon, to have raked some clouds together, and perhaps induced them to have helped us to a flash or two of lightning. But what was the fact here? why there warn't report enough to skeer a rabbit, or set a spider swinging! There warn't, as I could hear, e'en a tune played on a trumpet. Tho' there are chaps here, I've been told, in some of the big bands, who could blow a French horn out of curl, there warn't a puff of wind from one on 'em; and the neglect was the more mindful, seeing the public hadn't received the usual notice from the weather; for that's a fact I've got to tell you, Deacon—that there's allers one grand featur of an English celebration, and that's an all-fired lot of wet; whenever there's a holiday or rejoicing, or any "come out" whatever, sure as a rifle comes the wet, and the wet in downright arnest. If it had been drizzling days before, or e'en coming down occasionally by the basonfull, or pailfull, on a celebration day it seems to feel an extry stimulus, a sorter call upon its energies, and down you have it then—going the entire tub! and yet, strange to say, to-day, Deacon, the heavens were quite clear, even the sky seemed to respect the great event about to happen, and, in order to ensure a proper harmony, resolve on making the human sunshine a sorter double of its own.

Well, as soon as breakfast was over, which was right early you'll believe, and I s'pose I needn't tell you was particular fraternal, I borrowing a knife or teacup from my French and German friends, and they, in the like spirit, borrowing my butter, loaf, and sugar;—I dressed myself right off, and set off on a sharp walk, afore the Palace doors were open'd, jist to note the look of London and the state of things outside the building, afore I gin my ticket and went in. Well, you'll 'spose the streets that mornin' warn't quite a pictur' of a prairie;—warn't as empty and as silent as the mammoth caves of old Kentuck. If they were ever meant for human akyducts, I guess they then fulfilled their eend. As I've said to you already, Deacon, it's only a feller who has lived West and seen its style of rivers, that can form any notion of the noisy stream of London; and he must have been there in the spring too, and seen 'em swollen by snows and freshets, to fancy such a flood as I beheld this morning. 'Taint no use to describe it, Deacon, and so I shall hold off, and jist tell you what I thought was the wonder next in size to it. That was the gals, Deacon, the gals—the crowd, and look, and gear on 'em;—almost two to one to the men, and bless their hearts, in point of looks, worth four to one at least; such an everlasting lot of bonnets was outside of all arithmetic! I don't believe they were ever dreamt on by all our manty-makers on a floor; and as for the faces under 'em, and the figgers they belonged to—ah, I want a patent tongue, Deacon, to give you half a thought of them. You know I'm a high-tariff man, and go for home-made articles, and I reckon that our Eastern gals aint the worst of living samples; but the truth is still the truth, whether its taste is sweet or bitter, and the fact can't be denied, that the gals here are the jam—first chop, and nothing under;—with their white skins, and rosy cheeks, and round, springy, little figgers, I vow if there ain't some on 'em that look good enough to eat. They ought to make a feller's fort'n if he could git 'em or a bar, jest to taste the slings on mixing 'em, and so save the need of sugar. And here, to see 'em by the thousand, not in couples but in droves, and all as straight, and round, and nicely rigged as the mast of a new schooner; in all manner and sorter notion of the most dreadful pretty dresses, white and blue, and green and yeller, with satin bunches in their bonnets that looked as slick as mushrooms, and ribbons long enough to moor a fleet of whalers to the Pole. And there was suthing more than that, too; there warn't only their own bright faces, and happy, well-filled hearts, I guess their arms were filled as well; they brought no eend of babies—the most awful pretty toads you ever clapp'd your eyes on—little, staring, springy critters, that seemed to have caught the jineral feeling, wanted to go ahead like others, and no wonder if they had, for they had been accustomed to high preshur. Those babies were a sight, Deacon; in the great show of the day they were the mothers' contribution, and I vow I thought it hard there warn't a counter to display 'em.

Well, thro' this stream I tried to steer, on an eastern and southern cruise, before I luffed and bore away for the great haven in the Park; but, arter what I've told you, you'll guess with what success. Every move was agin a tide that every moment was gitting stronger, thickening up from every street and doorway that fed the leading channel, till at last I was fairly wedged, Deacon, caught fast, and swung about like a skiff or a canoe that you try to paddle up a mill-race; and once I got agoing, there was no help but to go on, and so the great flood carried me, till I found myself brought up agin a tree in the big park, when you may s'pose I threw out my irons, and for a spell or so made fast. But raelly I soon found there was a bigger need than that, to hold on to life itself. In less than half a minet I felt like cotton in a screw—as well packed as the middle cod fish in a barrel from Cape Ann. What with the stomac of one feller, and the elbows of another, I got crooked like the letter S, and raelly begun to think I should want a garden-roller to put me straight agin. And jist at that moment, to put a moral in the matter, there came a cloud across the sky and a little dash of rain, to make us mindful of the mixtur and onsartainty of happiness; and I thinking this was the beginning of the usual public weather, why I got a little skeered, for, says I, if here I stick, scrouged and squeeged and twisted, and almost asking leave to breathe, and the wet comin' down to boot, I shall have to spit like mad to save myself from drowning, to say nothing of the chance that if all the gals and fellers jam and soak for a couple of hours, they'll grow so etarnal moist they'll all lump up together into one entire pudding. So I'll leave you to guess my feelings. Here it was close on eleven o'clock, when the doors were ordered to be shut, and I jamm'd up in the crowd, half a mile off the building, wedg'd as fast as any flat boat that was ever carried into the woods, or any joist-pin that was ever driven thro' a rafter of white oak. It seem'd as sartin' as tomorrow I should lose the opening arter all, arter coming four thousand miles to it: arter my contributions had been shut out, here I should be shut out myself, and that too, bear in mind, arter I'd been forced to buy a ticket, and pay fourteen dollars good to help erect the building. Now, warn't this enough to rile a man,—to make him oncommon wolfy? And yet it warn't the worst, the winch had yet another screw in it; where do you think I was standing? why, within view of the road where the Queen was to come directly, and the visitors kept streaming right away towards the doors, and promising soon to brim the building right up to the roof. Here was I to stand and see it all,—to know al I had done and suffered, and have nothing more bysway of recompense than a fair amount of cussing. Well, I bore it for some minits,—stood looking at the road, and seeing the carriages bolt by, and the ticket-folks pelt arter 'em, looking as happy and as proud as if they were a rael arystocracy; and every now and then, I fancied, giving a squint over at myself, as tho' they know'd the fix I was in, and were larfing ready to split at it: till the heat wouldn't rest no longer, I fairly biled up at last, and if I hadn't set my paddles going I s'pose I must have busted; but all of a sudden, making a spring and a twist out of my socket, digging this feller in the ribs and t'other on the shins, and so winding myself along in a sorter corkscrew fashion, I reached the road at last, and jump'd clean into the middle on't; when, a carriage going by, I vow if I didn't hook on and ride up to the warehouse doors, a hull possee of policemen running arter me full pelt, and crying out "Come down." But, says I, "Oh, don't be skeered; I guess I've come down already—come down with fourteen dollars for my ticket to go in, and as I've got the chance at last, I rather think I'll have its vally."

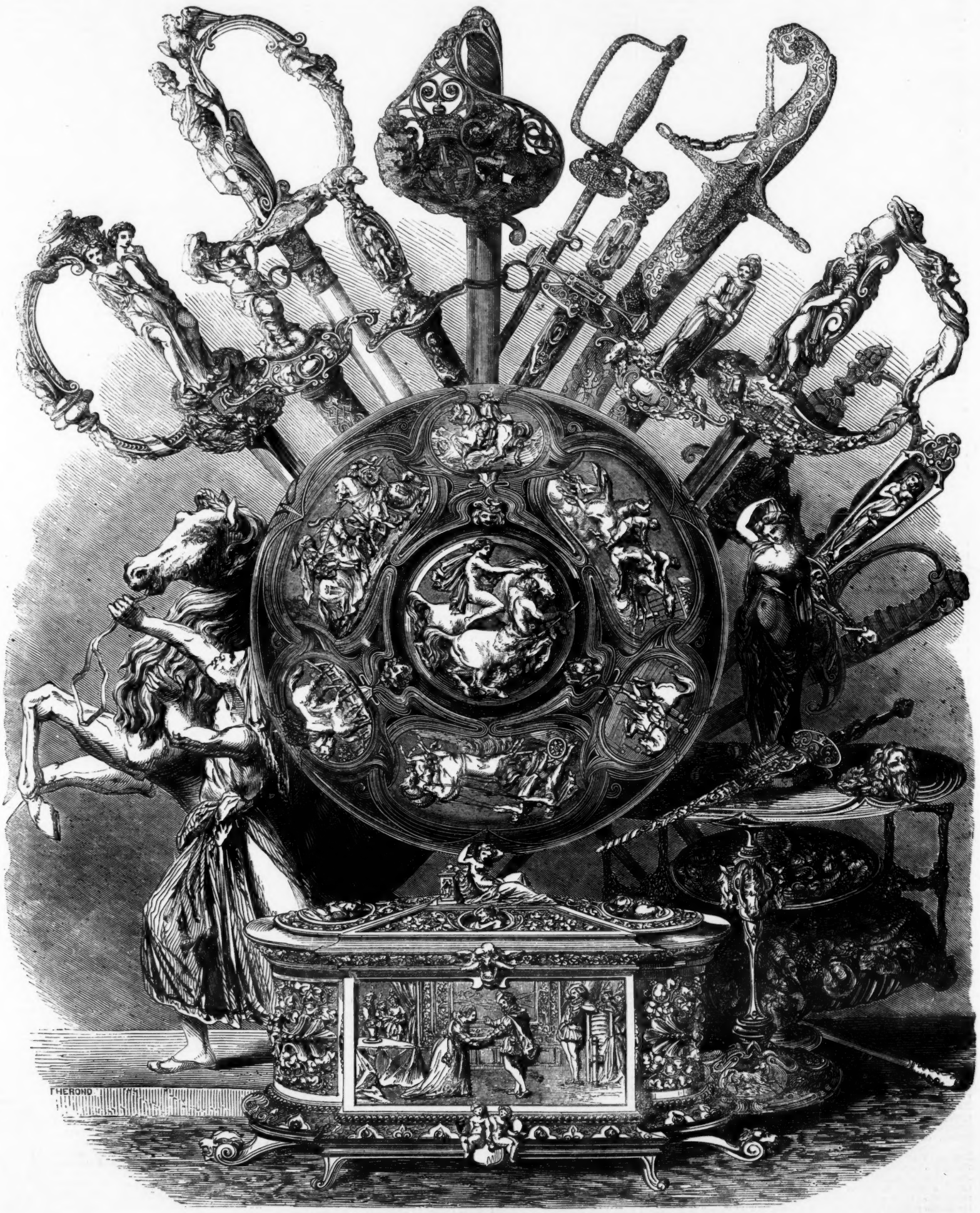
Well, the sight on it soon settled 'em,—as well as the fellers at the doors, and in I went, and for the matter of ten or fifteen minutes I

as like a feather in an eddy, whirl'd round and round onceasing, and carried here and there without power to move, or stop, or hold on as I liked: I found myself in the middle of above twenty thousand people, all scutling about for places, and not at all the wust ones; and I s'pose it wouldn't have stopp'd all day, but that all of a sudden the doors were closed and the police sung out "the Queen," and then "to places" was the word, and in less than half a minit the scrambling was all over, and the great, hurrying, whirling current became a solid body, and stood as still, and pale, and silent as tho' it had suddenly got frozen by some new great force of chemistry; and, as good fortin chose to have it, I was one of the particles within sight of the Royal platform—in what they call the Transept, right afore the chair and canopy—tho how I got there, marsy knows, and two of the policemen—and having this position, the very best in the whole building, you'll naterally expect me to give an account of all that happened—to give a full and clear detail of the hull inaugurating sarrymony. Well, all I can say is this, Deacon, that when I looked up and saw above me that gorgeous arch of glass, that seemed to be hung up in the air, as a bridge for the feet of angels, and when I view'd the very beings, angels themselves, by thousands, young, and pure, and beautiful, in their white and shining dresses, bending over the great galleries or lengthening out in lines below, with looks that seemed only made to shine with praise or mercy; when the sun too burst upon 'em, as tho' the heavens at that moment were smiling down on their lost tenants, and the great organs began to play the grandest mammoth kind of music, and the excellent Queen herself came to take her seat among her sisters, as the pattern of the whole and the type of their good influence, and the chorus then burst out, as I thought from heaven itself, in a grand and solemn strain of homage and thanksgiving—a strain cherubs might have sung, and thousands did about me—when I saw and heard all this, Deacon, why I confess I lost my senses;—they went clean off altogether, I was whirled up into a dream or trance, and thought I'd done with the world for ever;—so, as for seeing or hearing arterwards, and noting anything so poor as forms, and shows, and sarrymonies, mine warn't at all the soul, Deacon, and I refer you to the noospapers.

Your respectful and affectionate

PELEG E. WHEELER.

(To be continued.)



GROUP OF ARMS, &C.—BY GUEYTON.

GROUP OF ORNAMENTED ARMS, CUP, &c. BY GUEYTON.

M. Gueyton's display of artistic silver-work is very splendid, and its examination will gratify a higher taste than that of mere idle curiosity. This exhibitor also pretends to a new and improved method of electro-plating, by which the expense is much lessened, leaving, necessarily, a larger proportion of the price of the article produced to reward the labours of the designer and fashioner. The group of objects which we engrave comprises a variety of sword-handles, in gold and silver, most admirably decorated with sculpture and engraving, and chasing and precious stones, in various manners; a dressing-case, of pure *Rénaissance* style; and a prize cup, or racing plate. The last-named work is extremely interesting, the subjects being most appropriate and happily chosen, and the execution in the very best style of art. It represents, as will be observed, the principal phases in the history (natural and educational) of the horse—the three principal being the ancient chariot-race, the mediæval tournament, and the modern race—"the race" *par excellence*. In the intermediate spaces we see the interesting quadruped first as a colt by the side of his dam; next in the stable; and in the last place, proudly bearing his master, a gallant cavalier, across the country, probably to the wars. In the centre is a group representing the education of Achilles by the Centaur.

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